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EDITOR'S NOTE

As this journal is readied for the publisher, three recent events have been noteworthy. The first was the very successful visit of the US Defence Secretary Mr Ashton Carter, to India, that emphasised the growing cooperation between our two countries; the type of cooperation that cannot but be mutually beneficial. The second event of note was the visit of our Prime Minister to Bangladesh and the signing of the Land Border Agreement which should, along with other agreements, herald an era of greater regional cooperation that again will be of mutual benefit. The third issue was the successful military operation at, or across, the Myanmar border to attack the militants who had killed 18 of our soldiers a few days earlier. This military action was carried out in cooperation with the Myanmar Army and was indicative of not merely regional cooperation but also the intent of our government to tackle the problem of insurgency more effectively. All three events have a common factor in that they all fall within the rubric of Defence and Diplomacy.

The articles in this issue of the journal cover diverse fields. China can never be far from our strategic thought. For some months now, China has advocated the creation of the necessary facilities and sought the participation of countries in the Maritime Silk Road initiative. The initiative will certainly help China project its power and be of immense economic benefit to it. To some extent, it will also help the other countries but the existential 'threat' from China continues to loom large, particularly as China has of late taken massive strides in improving both military and commercial maritime capabilities. It also does not help that the idea of the Silk Road is incompatible with Chinese activities and pronouncements about the East China Sea and

South China Sea. In his critique on the initiative, **Dr Vijay Sakuja** addresses some of these issues and more.

Staying with China, **Tseyang Lhamo** discusses the chequered history of US policy towards Tibet. The author opines that the story is of big power rivalry where Tibet was, and is, a mere pawn. She argues that the US approach has shifted from Nationalist China's suzerainty over Tibet to an independent Tibet, to covert support to Tibet, to abandoning the Tibetan cause. At present, it appears that the growing might of China is more important than human rights issues in Tibet.

In an article by **Shaheli Das**, the focus shifts to Africa and the inroads made by China in that continent. In a well researched and argued article, the author discusses the pros and cons of Chinese trade ingress into Africa. China is now the biggest trading partner of Africa but many countries and, more particularly, the populace, view China with some suspicion. The Chinese motives beyond trade have often been questioned. In fact, India is viewed as more in tune with African requirements, more particularly as both require the Indian Ocean to be a zone of peace. However, the West is also conscious of the riches that Africa offers and their interest in doing business with Africa is growing.

In January this year, the head of the Defence Research and Development Organisation (DRDO) retired and the debate on the functioning of that organisation was joined by many. An organisational change has since been instituted. The head of DRDO is no longer the Special Assistant (SA) to the Raksha Mantri (RM) as another scientist has been appointed to that post. However, DRDO has to live up to its promise and there have been many suggestions made in the media. This issue carries two articles on the subject. **Manoj Kumar** uses the McKinsey 7-S framework to analyse the working of DRDO and recommends further changes to enhance its competitiveness and accountability. **Dr. Prakash Panneerselvam**, like many others, is concerned about the large scale import of defence equipment and makes suggestions to stem the tide and to introduce greater indigenisation.

The impact of Electromagnetic Pulse (EMP) on the functioning of our equipment has excited the minds of defence planners for many

years. As a result, much misinformation has been generated. In a well presented article, **Ashish Gupta** explains the physics and utility of the system. The article is timely as EMP weapons are no longer in the realm of science fiction.

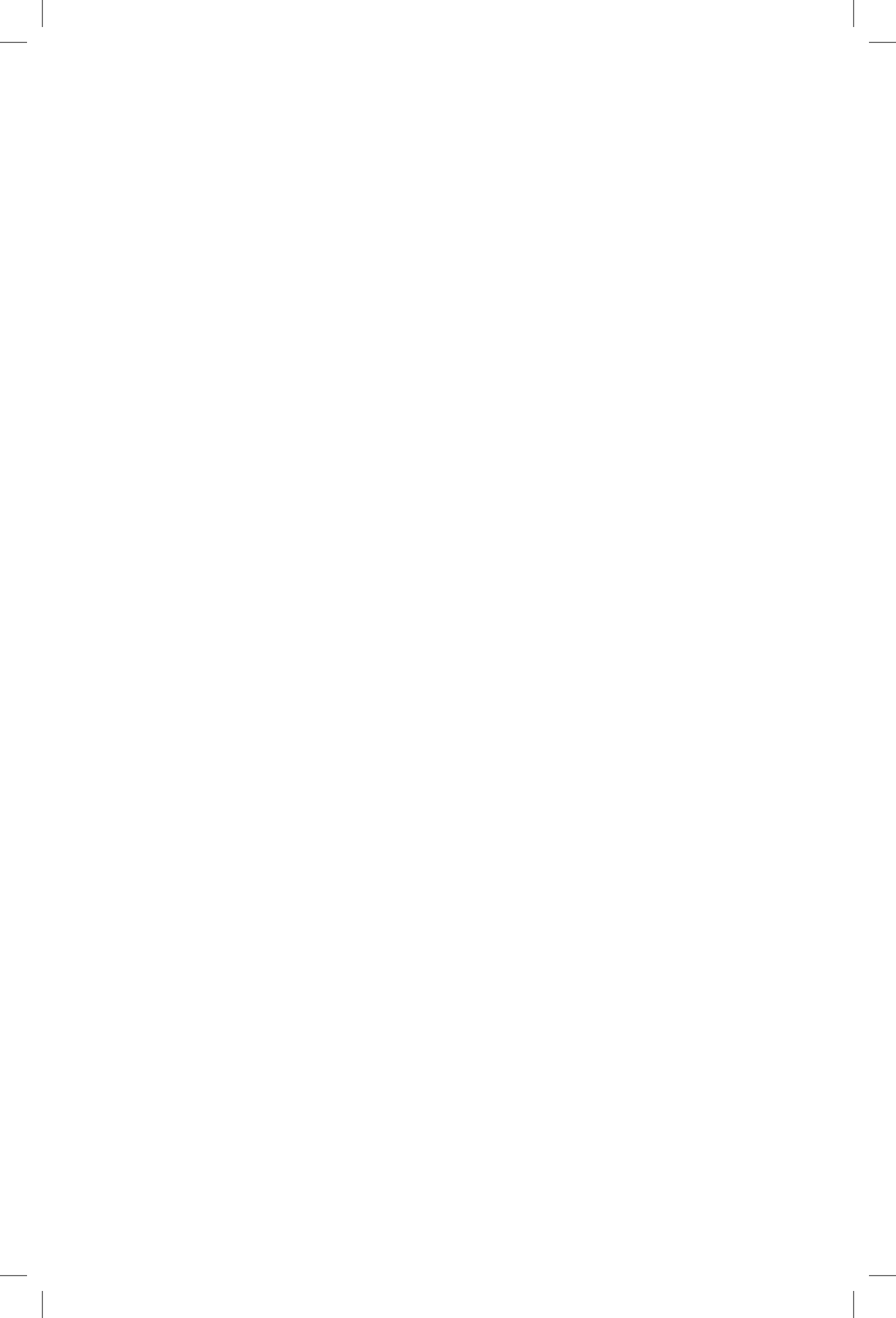
The misuse of cyber space is a growing menace. Now cyber space is being used by terrorist organisations to recruit terrorists. Some reports suggest that the Islamic State in Syria (ISIS) has recruited some 20,000 people through the internet and other social media. The internet facilitates maintenance and updating of databases and all other information. It represents a more effective method to undertake nefarious activities as well. The domain can be, and is, also used for fund raising, etc. **Dilipraj** examines this misuse and what, if anything, can be done to stop it whilst not impacting individual freedoms.

We live in an area prone to emergencies and natural calamities. The history of the Indian Air Force (IAF) is replete with occasions where the IAF has provided relief and succour to those in need as a result of earthquakes, floods, tsunamis, wars in distant lands, etc. **Ashok Chordia** discusses how small and incremental improvements can make the IAF effort more humane and effective.

And, finally, the article by **Kriti Singh** is on the 'new media', its meaning and impact. The new media is characterised by being interactive and by the use of the internet. The differences with the 'old media' are stark. Kriti also discusses the impact of the new media on defence organisations and practices.

Happy reading





CHINA'S MARITIME SILK ROAD INITIATIVE: A CRITIQUE

VIJAY SAKHUJA

China's plan to revive the ancient Silk Route has attracted international attention. In its political construct, the Silk Route is a diplomatic initiative aimed at building robust relations with countries in Asia and beyond; the economic component of the initiative features building infrastructure to support its trade relations with countries along the route; the strategic construct pivots on the notion of building outposts for the navy to facilitate operations in the Indian Ocean and beyond; and in its cultural context, it would help China to promote Chinese culture and enhance tourism. In essence, the Silk Route offers China a number of opportunities to develop a multi-pronged strategy to help reach out to the wider international community and to dispel the omnipresent 'China threat' among a number of countries. In the above context, this paper attempts to offer a critique of the oceanic dimension of the Silk Route i.e. Maritime Silk Road (MSR) and explores its economic and strategic dimensions. The paper also argues that India could benefit by embracing the economic components of the MSR.

HISTORICAL CONTEXT

During ancient times, China endeavoured to build social, cultural, trade and diplomatic connections with the outside world while

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maintaining that the Middle Kingdom was the centre of the world. The roadmap for these initiatives was built around the ancient 'Silk Route' which crossed Central Asia, Eurasia and beyond, linking Asia with the Mediterranean, stretching to thousands of kilometres. This route passed through the rugged mountainous terrain and vast deserts, and camels, mules and yaks carried goods across the region passing through the Pamir and Karakoram mountains. Caravans carrying luxury items crossed the Tarim Basin, Kashgar, Ferghana Valley, Persia, Syria, and beyond. According to the Chinese, nearly 2,000 years ago, Zhang Qian travelled on a diplomatic mission to the west from a place which is modern day Xi'an through Gansu province, Xinjiang Uighur Autonomous Region, and Central and Western Asia and reached the Mediterranean.

Unlike the 'Silk Route', the southern land routes to India and the Indo-China region had to pass through mountains, dense tropical forests and numerous river systems, making overland transportation difficult and inhospitable. Thus, the intra-Asian trade (silk, porcelain, spices, incense, animals, etc) also called 'high value- low volume' was conducted over the seas. Traders from China, India, Southeast Asia and Persia sailed through Asian waters and facilitated a flourishing maritime enterprise and a sophisticated maritime trading system emerged in Asia that contributed to the growth of China, India, Persia, and Southeast Asia. This Asian trading system through the Indian Ocean came to be known as the Maritime Silk Route.

TWO SILK ROUTES

In the 21st century, China is attempting to recall the ancient Silk Route and promote the idea of the 'Silk Road' which has two components i.e. Silk Road Economic Belt (SREB) and the Maritime Silk Road (MSR).¹ The former traces the traditional Silk Route over land and has a strong economic and cultural orientation. China has been engaging a number of Central Asian and Eurasian countries through economic interactions. It also has cultural underpinnings,

1. For a detailed account of the Silk Road Economic Belt (SREB) and the 21st century Maritime Silk Road (MSR), see <http://www.xinhuanet.com/english/special/silkroad/index.htm>. Accessed on April 26, 2015.

and China has hosted a number of events in Central Asia and as far as Turkey, to disseminate its cultural heritage and history. This has a strong tourism potential and can be leveraged by India to develop the 'Buddhism trail' across China and Southeast Asia.

The MSR, as the name suggests, has oceanic connections. In October 2013, in a speech during the 16th China-Association of Southeast Asian Nations (ASEAN) Summit in Bandar Seri Begawan, Brunei, Chinese Premier Li Keqiang put forward a seven-point proposal on China-ASEAN cooperation. The sixth point referred to the Maritime Silk Road and read, "We need to steadily advance maritime cooperation. We should work together to build the Maritime Silk Road of the 21st century, and intensify cooperation on marine economy, maritime connectivity, marine environment protection and scientific research, maritime search and rescue and fishery"²; and, hence, emerged the Chinese idea of the MSR to enhance maritime cooperation not only with the ASEAN countries but also with other South Asian countries.

Earlier in 2011, Premier Wen Jiabao at the 14th ASEAN-China Summit in Bali had proposed the China-ASEAN Maritime Cooperation Fund and committed Yuan 3 billion to support "ASEAN-China cooperation in the areas of maritime scientific research, connectivity and navigation safety, particularly to implement agreed cooperative activities and projects within the DoC framework"³. It also announced the Procedures for Project Application under the ASEAN-China Maritime Cooperation Fund and encouraged ASEAN member states to submit project proposals seeking funding from the fund.

Apparently, the ASEAN countries had welcomed the Chinese initiative but had sought a number of clarifications such as the management of the fund, Chinese involvement in these projects, public-private partnerships, and, above all, security issues which undermine Chinese intentions. The Chinese clarified that the initiative is just an "idea", an "open ended platform for cooperation" and it is open to "good suggestions from other countries"⁴.

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2. Press Conference by Hua Chunying, Foreign Ministry spokesperson on October 10, 2013 at the Consulate-General of the People's Republic of China, in Sydney.
 3. "ASEAN-China Dialogue Relations", <http://www.asean.org/asean/external-relations/china/item/asean-china-dialogue-relations>. Accessed on March 24, 2015.
 4. Sutirtho Patranobis, "China: Want Sri Lanka's Partnership in Building Maritime Route", *The Hindustan Times*, February 13, 2014.

Since then, China has encouraged a number of countries in South Asia, including Sri Lanka,⁵ and Maldives⁶ and Bangladesh⁷ to join the MSR and these countries appear to be quite excited about the idea. Interestingly, the MSR also figured during Vice President Hamid Ansari's visit to China in June 2014 and India has sought "more details to be able to study the proposal in all its fullness".⁸

ECONOMIC CONTENT OF THE MSR

One of the significant features of the MSR is the development of maritime infrastructure along the route. This includes finance, technology and human resource intensive projects that require a number of capabilities to conceptualise, execute and, above all, deliver on schedule.

At home, China is endowed with a long coastline of 6,000 nautical miles (nm) on the mainland and some 3,500 islands generate additional coastline, and an Exclusive Economic Zone (EEZ) of 3.8 million sq km. The Chinese leadership is conscious of the geographical advantages and in August 2013, President Xi Jinping, while chairing a group study session of the Political Bureau of the Communist Party of China Central Committee, tasked experts to draw a roadmap to become a maritime power and noted that a "developed marine economy is an important part of building maritime power".⁹ Significantly, the gross product value generated by China's marine industry in 2013 was valued at US \$ 884.9 billion and US \$958.7 billion in 2014 and has grown at an average of 7.6 per cent during the last three years.¹⁰

Today, China is among the top five countries in shipbuilding, ports, shipping, offshore resource development, inland waterways, and marine leisure industry. It is also one of the top suppliers of human resource who are employed by the international shipping

5. Chulanee Attanayake "Sri Lanka; the Best Stop-over in China's Maritime Silk Road", *Sunday Island*, June 1, 2014.

6. "Chinese President Welcomes Maldives in Maritime Silk Road Construction", *Xinhua*, August 16, 2014.

7. "Maritime Silk Road and Economic Belt: Emerging Opportunities for Bangladesh", *The Daily Star*, October 1, 2014; "China, Bangladesh Pledge Joint Efforts to Build Economic Corridor", *Xinhua*, June 10, 2014.

8. "India Okay with BCIM, Wants Details on China's Maritime Silk Road", *The Economic Times*, June 30, 2014.

9. "Xi Advocates Efforts to Boost Maritime Power", *Xinhua*, July 31, 2013.

10. "China's Marine Economy Expands 7.6%", *Xinhua*, February 10, 2015.

companies. China ranks third in shipbuilding behind the global leaders i.e. Japan and Korea. Chinese shipyards are also proficient in building warships and in the past constructed submarines, destroyers, frigates, auxiliary and logistic vessels, space monitoring ships and, more recently, hospital ships. Likewise, China is also building an ice breaker research vessel for undertaking voyages in the Arctic sea/ice.

In 2012, China emerged as the world's third largest shipping fleet in terms of capacity, after Japan and Greece. The Chinese merchant fleet is built around a variety of vessels that include bulk carriers, oil tankers, Liquefied Natural Gas (LNG) and gas carriers, container vessels, Ro/Ro ships and passenger liners. One of the greatest success stories of China's economic miracle has been the development of container ports and container shipping. Seven of the top ten global container ports are in China and these are of international standards and can compete with ports in the US and Europe.

According to a World Bank report, by 2030, 62 per cent of the world's seafood will be farm-raised and China will emerge as a large market for fish and that "with increased investment in aquaculture, China will produce 37% of the world's fish and consume 38% of the fish the world eats".¹¹

It is fair to say that China has the capacity to build marine infrastructure at home and overseas and the construction of Gwadar port in Pakistan, Hambantota in Sri Lanka and plans to develop Sonadia port in Bangladesh¹² are good examples of Chinese success stories. In 2013, Beijing Interoceanic Canal Investment Management Co. owned by a Chinese businessman, had tied up with the Ukrainian Kievgidroinvest LLC to build a new deep water port in the Crimea, reconstruct the Sevastopol port, and develop an economic zone. The project was to be completed in two phases at a cost of US \$ 10 billion.¹³

The long dormant Kra Isthmus project which envisions a 26-m-deep and about 100-km- long artificial link through Thailand to connect the Bay of Bengal and the Gulf of Thailand also fits into the

11. "Raising More Fish to Meet Rising Demand", <http://www.worldbank.org/en/news/feature/2014/02/05/raising-more-fish-to-meet-rising-demand>. Accessed on August 26, 2014.

12. Sheikh Shahariar Zaman "India to Evaluate Building of Deep-sea Port", *Dhaka Tribune*, June 15, 2014.

13. "Chinese Billionaire Plans \$10 Billion to Develop Ukrainian Port", *Bloomberg News*, December 6, 2014.

MSR. According to Pakdee Tanapura of the Thai-Chinese Cultural and Economic Association and a member the National Committee for the Study of the Kra Canal Project, the Kra Canal could be part of the new Chinese “Maritime Silk Road”. China has shown interest in the project and according to reports, in 2007, Thailand approved the Chinese plans. The estimated cost of the project was US \$25 billion, and it would take nearly 10 years and involve nearly 30,000 workers. A new pre-feasibility study estimates that the project could cost about US \$20 billion and it will be possible to build a two-lane canal, which would allow transit by vessels of up to 500,000 DWT at a speed of 7 knots. In 2014, LiuGong Machinery Co. Ltd and XCMG, state-owned companies, in partnership with the privately owned Sany Heavy Industry Co Ltd, began to study the project, which involves a special economic zone alongside the canal that can potentially generate nearly three million jobs and attract more foreign direct investment to the region.

Similarly, Jask port in Iran is strategically located in the Gulf of Oman and overlooks the Arabian Sea. Iran has invited China to develop an industrial park on a 4-acre area in Jask port. The project involves development of petrochemical, aluminum and steel industries and a refinery. For Iran, Jask port serves as an alternate point of loading of oil and gas to international customers in case the Strait of Hormuz is blocked due to political reasons and navigational constraints. In this context, Iranian President Hassan Rouhani stated, “Jask should turn into Iran’s second hub for exporting oil...By implementing the plan, exports of oil won’t rely on just one port and one place (the Kharg Island) in the Persian Gulf and through the Strait of Hormuz, but it will also be available through the Sea of Oman.” These capabilities are now being leveraged by China to develop maritime infrastructure in friendly countries that are more than willing to accept the offer.

STRATEGIC UNDERCURRENTS

The MSR also has significant strategic dimensions and has attracted the attention of analysts. It is true that China has aggressively pursued the agenda of building maritime infrastructure along the MSR in friendly countries such as Pakistan (Gwadar), Sri Lanka (Hambantota and Colombo) and Maldives. China is also exploring port projects

in the Kra Canal in Thailand and Jask in Iran. Significantly, these projects should be seen in the backdrop of the MSR, which envisages a network of ports to support its trade relations with the countries along the route – Southeast Asia-South Asia-West Asia-Africa and the Mediterranean Sea which is considered as the western end of the MSR. It has been observed that “Chinese companies have poured considerable resources into modernizing and expanding Mediterranean ports, including the Port of Piraeus outside of Athens, Greece.”¹⁴

It is widely believed that these port projects have dual-use facilities and will be part of the Chinese naval strategy for the Indian Ocean, which is seen by the Indian strategic community as bases/facilities to support the People’s Liberation Army Navy’s (PLAN’s) future operations in the Indian Ocean. The MSR has invited sharp reactions from the Indian strategic community and these emerge in three distinct discourses:

- “Strategic encirclement of India” by China through covert and overt military-strategic support to India’s neighbours, particularly Pakistan. This is a term used by the Indian strategic community.
- The “String of Pearls”, coined by Booz Allen Hamilton, a consultancy firm highlighting China’s energy supply chain strategy. The US strategic community has used this term to explain the Chinese naval presence in the Indian Ocean.
- The “‘Maritime Silk Road’ is apparently to dispel the ‘China threat’, which envisages ‘shared destiny’ of China with other Asian countries through joint development of maritime projects to provide impetus to economic growth”.¹⁵

WHAT SHOULD INDIA DO?

Maritime infrastructure is the vanguard of globalisation and its importance for countries that are reliant on the sea for economic

14. Jeremy Bender, “China’s Naval Exercises in the Mediterranean are Linked to Beijing’s Ambitious ‘New Silk Road’ strategy”, <http://www.businessinsider.com/china-energy-security-in-mediterranean-2015-5#ixzz3aGjAeeZp> <http://www.businessinsider.com/china-energy-security-in-mediterranean-2015-5#ixzz3aGhAuMTx>. Accessed on May 16, 2015.

15. For more details see, “Indian Ocean: Multilateralism Takes Root”, <http://www.ipcs.org/article/india/indian-ocean-multilateralism-takes-root-4612.html>. Accessed on April 26, 2015.

interdependence, growth and prosperity needs to be underlined. Significantly, maritime infrastructure is critical and is the keel of economic globalisation as it facilitates the global economy. India suffers from a number of technological gaps in its maritime infrastructure and it will be important for it to get more details about the MSR and explore joint maritime projects which would help it build its maritime power potential. These could include:

- **Port Development:** Nearly 97 per cent of India's foreign trade by volume and 75 per cent by value is carried on board merchant vessels, and, therefore, the seaports play an important role in the national economy. The Indian ports are plagued by lack of modern equipment which results in high turnaround time. Besides, the warehousing and cargo removal transportation system is poor. In the container sector, the Indian trade is trans-shipped through neighbouring ports such as Colombo, Dubai and Singapore.
- **Shipping:** In 2013, the Indian fleet comprised 14.56 million gross registered tonnage (grt) and comprised 1,164 ships of which 358 vessels were engaged in international trade. However, the average age of the Indian fleet is about 17.0 years, and nearly 501 vessels are over 20 years old.¹⁶
- **Shipbuilding:** The Indian shipbuilding industry is quite small and constitutes a miniscule percentage of the global shipbuilding market. Most of the Indian shipyards are public sector enterprises and are plagued with inefficiency, high cost of construction, and irregular delivery schedules as also low quality.
- **Fisheries Production:** India has a long coastline and its EEZ is rich in marine living resources, but fisheries development in India has been a slow process due to lack of coherent policies and investment by the government. As a result, Indian fishermen do not engage in deep sea fishing, and are unable to compete in the international market.
- **Inland Waterways:** Nature has endowed India with perennial rivers and several inland water bodies such as rivers, lakes, canals backwaters and creeks. Overall, the Indian inland water system network comprises only about 10,000 km of rivers and more than 4,000 km in canals.

16. Report of *Indian National Shipowners' Association Annual Review: 2012-13*, Mumbai.

- **Marine Leisure Industry:** Cruise tourism in India has been a neglected and overlooked industry. Also, there is scarcity of accurate information and whatever is available is inadequate and poorly collated, with the result that India has not been a popular cruise destination among the cruise line industry. Significantly, most cruise liners bypass India either to Southeast Asia or the Middle East.

However, it is important to point out that the Chinese companies have been barred from participation in India's maritime infrastructure projects due to security concerns. For instance, the installation of a Chinese made 10-cm S-band doppler radar system imported by the Indian Meteorological Department for real-time monsoon predictions was rejected and a joint venture in the Vizhinjam Deep-sea Container Trans-shipment Terminal project involving a Chinese company was not cleared.

CONCLUSION

China has pushed its idea of the MSR aggressively among a number of countries in South Asia and the Indian Ocean, particularly the small island states, and won support since they are constrained due to lack of expertise and finances. The MSR also helps China to dispel the notion of the 'String of Pearls' strategy and legitimise its engagement in various maritime infrastructure projects along the route. Further, China's appetite for new port projects, deep pockets to support these, and its ability to deliver quality products would continue. It will help China to push the MSR aggressively among a number of countries in the Indian Ocean, particularly the small island states that lack both expertise and finance. Although India is not in a position to support similar projects due to fiscal and technological constraints, it could participate in, and benefit from, the MSR.



US POLICY TOWARDS THE TIBET ISSUE

TSEYANG LHAMO

INITIAL CONTACT

The US interaction with Tibet occurred in the backdrop of World War II. The US negotiated an agreement with Tibet to open the supply route to China as the Japanese had blocked China's land supply route in order to aid the Nationalist China government that sought America's assistance. Hence, the US sought help from the British who had a representative in Lhasa to seek permission from the Tibetan government. After receiving permission, two members from the Office of Strategic Service visited Tibet and delivered a letter from President Franklin Roosevelt to the 14th Dalai Lama.

The US, being China's ally, accepted the then Nationalist China government's claim of suzerainty over Tibet. From Washington's perspective, contacts between President Roosevelt and the Dalai Lama were not considered government-to-government relations.¹ Furthermore, then US Ambassador to India, Roy Henderson mentioned that Washington's policy was to recognise Chinese suzerainty over Tibet. These statements vividly demonstrate that when Washington started dealings with Tibet in the 1940s, its perspective and stand on

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1. Melvyn C. Goldstein, "The United States, Tibet and the Cold War", *Journal of Cold War Studies*, vol. 8, no. 3, Summer 2006, p. 146.

Tibet were largely based on Nationalist China's terms. In the wake of the rapid disintegration of the Guomindang regime, around April 1949, the US Embassy in New Delhi proposed a review of the US policy towards Tibet to the State Department. The embassy suggested that the US should be prepared to treat Tibet as an independent country should the Chinese Communist Party (CCP) triumph over Nationalist China. It further suggested that amity with Tibet would be useful to the US. Unfortunately, irrespective of the suggestions, the US position on Tibet remained intact.

SHIFT IN STAND IN THE BACKDROP OF COLD WAR: CIA'S ROLE

As the events unfolded, and with the formation of the People's Republic of China (PRC) in October 1949, the outbreak of the Korean War in 1950 and the PRC's invasion of Tibet in 1950-51, the US started to show more interest in Tibet, and, at the same time, the Tibet issue got entangled in the Cold War. During the period of the Cold War, the Tibet issue had propaganda appeal. Communist China's actions were perceived as evidence of the Communists' desire for world domination and Tibet was seen and projected as a small nation struggling for its survival. The US objective was to contain China. After the 1959 national uprising in Tibet, the US government refused to accept China's annexation of Tibet and made references to Tibetan autonomy within Chinese suzerainty. US diplomats publicly discussed the idea of Tibetan self-determination. On January 17, 1962, Secretary of State Dean Rusk repeated the US stance that "the principle of self-determination should apply to the people of Tibet".² During the early years of the Chinese occupation, the US not only refused to recognise China's sovereignty over Tibet but also the Central Intelligence Agency (CIA) clandestinely engaged in aiding the Tibetans to attack Chinese troops in Tibet. The US Administration supported all three UN General Assembly Resolutions in 1959, 1961 and 1965 that called for China's withdrawal from Tibet. In December 1955, President Eisenhower authorised the CIA to undertake secret

2. Guangqui Xu, "The United States and the Tibet Issue", *Asian Survey*, vol. 37, no. 11, 1997, p. 1064.

activities to undermine international Communism, which led to the formation of underground, resistance and guerrilla groups.³

Since 1951, the US had maintained close contact with the Dalai Lama's brothers, Thubten Norbu who had been in America for nearly five years and his younger brother Gyalo Dhondup, who had been organising the Tibetan émigrés in India. The arrival of Thubten Norbu in India in 1956 signified the first phase of CIA involvement. It appears that he came with a proposal from the CIA to establish a clandestine network of activists inside Tibet. Thubten Norbu dealt with the CIA on these matters, and Gyalo Dhondup a Tibetan émigré, recruited volunteers. The first six Khampa recruits were flown to a secret American military base on the Pacific island of Saipan. They learned English and how to use a wireless, to read maps and how to organise guerrilla groups.⁴

From 1960 onwards, there was intensification of the CIA's involvement with the Tibetan guerrillas. Their earlier attempts to maintain small bases inside Tibet had been replaced by the a substantial garrison of Tibetan resistance groups along the Himalayan border. Around the mid-1960s, a meeting convened in Darjeeling to discuss the prospects of setting up a permanent base, agreed to set up such base in Mustang. Mustang is an area that is politically part of Nepal, however, it shares a common religion and language with the Tibetans. Moreover, in the 1960s, Nepalese control over this area was minimal.⁵

Around 150 Tibetans were sent to the US for training between 1960 and 1962. Later, the US developed a training centre in Colorado. The CIA made an arms drop and dispatched around 30 CIA-trained Tibetans to the Mustang base. The CIA-trained Tibetans formed cells of around 15 people, each headed by a CIA-trained leader. These cells were sent into Tibet and throughout the 1960s, there were skirmishes between the Tibetans and People's Liberation Army (PLA). In 1965, the CIA informed the Tibetans that there would be a gradual reduction in CIA funds to the Tibetans with an aim to cease it altogether in 1968. The decision to cease CIA aid to the Tibetan

3. Tsering Shakya, *The Dragon in the Land of Snows: A History of Modern Tibet Since 1947* (Great Britain: Penguin Compass, 1999), p. 170.

4. *Ibid.*

5. *Ibid.*, p. 283.

guerrillas could be attributed partly to the lack of success after years of operation and partly due to disagreements within the CIA over the worth of the Tibetans in America's global objectives. Moreover, in the backdrop of open confrontation between China and the Soviet Union, America's perception of China as a threat to its interest in Asia had reduced greatly. A decision to put an end to CIA aid to the Tibetans in Mustang was made long before Kissinger's secret mission to China that was followed by rapprochement between the US and China. Termination of CIA aid to the Tibetans in Mustang was a serious blow for the Tibetans.⁶

In July 1971, Henry Kissinger made a secret visit to Beijing and this was followed by President Nixon's historic visit to China in July of the following year. This visit led to rapprochement between the US and China. As the Sino-American relations improved, the Tibet issue was sidelined by Washington. In 1978, the US government stated unequivocally for the first time that Tibet was a part of China, without any mention of autonomy or the suzerainty link.⁷ Successive US Administrations have followed this stand since then. During the initial two decades (1959-1979) of the Dalai Lama's exile in India, he was not allowed to enter the US.

US POLICY (1980-1996)

From 1987 onwards, the Tibet issue in the US attained greater importance, characterised by much stronger support for it from Congress, and a number of resolutions pertaining to Tibet were passed. In June 1987, the US House of Representatives approved an amendment attached to the State Department's spending authorisation Bill. The amendment accused China of having imposed its rule over Tibet through military force since 1949 and causing political instability, imprisonment and wide scale famine that had resulted in the death of more than one million people. The Senate's version of the amendment was even stronger, and urged the president to consider China's human rights abuses in Tibet prior to approving any arms sales to China and it also implied that Tibet ought to be an independent state.⁸

6. Ibid., p. 282-284.

7. Xu, n. 2, p. 1066.

8. Ibid., p. 1067.

It is crucial to note that in the late 1980s, the Tibetan government-in-exile's efforts to garner increased political support for the Tibet issue from the US and the West took a major step forward with the launch of the "international campaign". This initiation commenced in 1986-87 when a series of meetings between Tibetan and Western supporters in different places like New York, Washington and London launched what has been identified as Tibet's "international campaign". Consequent to the launch of Tibet's "international campaign", the US Congress pressurised Washington to protect the culture of Tibet and accord the Tibet issue greater status under the US law.

The Dalai Lama visited the US on the invitation of the US Congress and received a warm welcome from the House Committee on Foreign Affairs. While addressing the committee, the Dalai Lama made a landmark statement about the five-point peace plan, and advocated dialogue and moderation. It was followed by Congress members voicing their support for the Dalai Lama's plan. The Dalai Lama made another significant speech in the following June at the European Parliament in Strasbourg. For the first time, he stated in public, his willingness to accept something less than independence for Tibet. It was marked by a significant shift in what the Tibetan cause sought, from independence to genuine autonomy within the framework of China. These statements of the Dalai Lama were well received in the US and had a significant impact on the Congressional attitude towards Tibet.

The Congress put non-binding measures into place in 1987, declaring that the US should make Tibet's situation a higher policy priority and should urge China to establish a constructive dialogue with the Dalai Lama. President Reagan signed into law the Foreign Relations Authorisation Act of FY88-89, on December 22, 1987, in which Section 1243 spoke of human rights violation in Tibet by the PRC. In 1985, 91 members of Congress reportedly had also sent a letter to China's President Li Xiannian, expressing support for continued talks with the Dalai Lama.⁹ These were clear manifestations of significant increase in the interest of the US Congress in activities relating to Tibet.

9. Kerry Dumbaugh, "CRS Report for Congress, Tibet: Problems, Prospects and U.S. Policy", *Congressional Research Service*, Updated July 30, 2008, p. 16.

The Tibet issue attained a new height under the Bush Administration (1989-1992). In March 1990, both Houses of Congress passed a joint resolution urging the president to proclaim May 13, 1990, a "National Day" in support of Freedom and Human Rights in China and Tibet. Congress authorised 1,000 special visas for Tibetans under the Tibetan provisions of the US Immigration Act of 1990 whereby 1,000 Tibetan refugees in India and Nepal were allowed to settle in the US.¹⁰

The George H W Bush Administration favoured cordial relations with China, hence, maintained a distance from the Dalai Lama until 1991. However, on April 16, 1991, Bush became the first American President to meet the Dalai Lama, succumbing to Congressional pressure. This meeting indicated a shift in the position of the White House because Bush had declined to meet the Dalai Lama two years earlier. In the meeting, Bush mentioned the persisting concerns in the US over the human rights problems in Tibet. Congress made bold provisions relating to Tibet, and a section under the Authorisation Act enacted in October 1991 was entitled "China's Illegal Control of Tibet".¹¹

UNDER THE CLINTON ADMINISTRATION

The Dalai Lama visited the US in 1993 and he was received by Vice President Al Gore. President Clinton was cautious and in order to avoid offending China, he arranged to 'drop in casually' for a few minutes, so as to make the meeting unofficial. This was the first time that a senior US official had entertained the Dalai Lama officially and discussed human rights issues for a long time.

During this period, an important issue of US-Sino relations came to light: the renewal of China's Most Favoured Nation (MFN) status. In May 1993, President Clinton signed an executive order to renew China's MFN status for a year with the attached condition that required China to make overall significant progress in human rights, including the protection of Tibet's distinctive religious and cultural heritage.¹² This signified that, firstly, the Tibet issue was given a

10. Xu, n.2, p. 1070.

11. John Kenneth Knaus, *Beyond Shangri-La: America and Tibet's Move into the Twenty-First Century* (London: Duke University Press, 2012), p. 237.

12. Ibid.

prominent place on the agenda of US-China bilateral relations and, secondly, the Tibet issue was integrated into the US' China policy.

Creation of Special Envoy for Tibet

Congress made numerous efforts as well as proposed various measures to establish the position of a US special envoy for Tibet with ambassador rank, particularly in 1994. These efforts of Congress paid off partially when the position of a special coordinator for the Tibetan issue, without ambassador rank, was established in October 1997 as a compromise to appeal to those who had proposed the position of special envoy. Gregory Craig became the first special coordinator for the Tibet issue and he was given the position by then Secretary of State Madeleine Albright in 1997. He was succeeded by Assistant Secretary of State Julia Taft in 1999. The special coordinator for Tibet caters to various issues like reporting on the religious freedom situation in Tibet and whether the Tibetan people are being treated with proper respect, as well as urging China to open a constructive dialogue with the Dalai Lama or his representatives and working towards preserving Tibet's unique culture, religion and language.¹³ Thus, the position of special coordinator for the Tibet issue was eventually created although without ambassador rank. Nevertheless, the very inception of such a position signified that there would be a higher level of official attention given to issues pertaining to Tibet.

Under the Clinton Administration, legislators successfully pushed through several measures on Tibet like establishment of the Voice of America Tibetan service; declaring Tibet to be an occupied country; Radio Free Asia broadcasts in the Tibetan language, etc. Furthermore, Secretary of State Madeline Albright took up the Tibet issue twice, first in February, and again in April 1997, during her meetings with senior Chinese officials. Both Clinton and Albright had urged Beijing to enter into a dialogue with the Dalai Lama. The Dalai Lama had meetings with Clinton, Gore, Albright and other government officials when he visited the US in April 1997.

13. Lu Fei-Chiao, "The United States' Tibet Policy under George W. Bush Administration (2001-2004)," *Bi-monthly Journal on Mongolian and Tibetan Current Situation*, vol. 17, no. 5, 2007, p. 52.

UNDER THE GEORGE W BUSH ADMINISTRATION

Tibetan Policy Act of 2002

Under the Bush Administration, a major policy initiative on Tibet came into being. It was called the “Tibetan Policy Act of 2002”, enacted as a part of the Foreign Relations Authorisation Act of the Financial Year (FY) 2003. Some of the important provisions of the Act were as follows: it made the position of special coordinator, to be instituted in the Department of State, a statutory requirement; it urged the US to seek immediate release of political prisoners; and it stated that the secretary of state should make efforts to establish an office in Lhasa, etc.¹⁴

Bush’s Meetings with the Dalai Lama

During Bush’s first presidency, Secretary of State Colin Powell appointed Undersecretary of State Paula Dobriansky as the special coordinator for the Tibet issue, making her the highest ranking US official to have taken charge of the Tibet issue. Also, she was in a better position or in a stronger bureaucratic position to perform her duties as compared to her predecessors. Dobriansky was appointed on May 17, 2001, a week before the Dalai Lama was scheduled to arrive in Washington to meet the new president. Bush’s meeting with the Dalai Lama is discussed later.

The first meeting between Bush and the Dalai Lama was held on May 23, 2001, during which Bush appreciated the Dalai Lama’s commitment towards non-violent struggle and expressed his personal support for his endeavour to dialogue with the PRC to resolve the issue. At the same time, mutual understanding between the Dalai Lama and Bush on the importance of Sino-American relations was also expressed and it was stressed that the dialogue between the PRC and the Dalai Lama’s envoys should not hinder or adversely affect the Sino-US relationship.

President Bush and the Special Coordinator for the Tibet Issue Paula Dobriansky spoke about the Tibet issue when they met Chinese President Jiang Zemin during the Asia-Pacific Economic Cooperation

14. Kerry Dumbaugh, *The Tibetan Policy Act of 2002: Background and Implementation* (USA: Congressional Research Service Report for Congress, 2009), pp. 4-7.

(APEC) conference in Shanghai, China, in October 2001. Bush, along with Dobriansky, visited Jiang Zemin in February 2002 and urged his Chinese counterpart to enter into a dialogue with the Dalai Lama. In April 2002, when China's Vice President Hu Jintao visited the US, he met Bush, Congress leaders and other officials. While meeting Hu, Bush stated that China must respect religious freedom.

The Dalai Lama met President Bush for the second time in September 2003 during his four-day visit to the US. Bush expressed his support, as he had, in the earlier meeting with the Dalai Lama. The Dalai Lama met Colin Powell, Paula Dobriansky and members of the US Congress a day before meeting the President. China had strongly objected to the holding of such meetings. Bush claimed that his meeting with the Dalai Lama was in the latter's capacity as a religious leader and Nobel Laureate, and that the meeting was a private one.¹⁵ All this clearly indicated that Bush had delivered on his promise to the Dalai Lama by raising the Tibet issue repeatedly in summits or during meetings with various Chinese officials.

Under the first term of Bush's presidency, the President himself met the Dalai Lama twice, Secretary of State Colin Powell met him three times and Paula Dobriansky met him five times,¹⁶ which undoubtedly point towards the US' robust engagement with the Dalai Lama irrespective of China's strong objection to any dignitaries having an audience with the Dalai Lama.

Congressional Medal of Honour to the Dalai Lama

Award of the Congressional Medal of Honour to the Dalai Lama was a landmark event in the US involvement with Tibet. Congress passed a legislation to award the Dalai Lama a Congressional Gold Medal in recognition of his international status and accomplishments. On October 17, 2007, the Dalai Lama received the Congressional Gold Medal at a ceremony at the Capitol Rotunda. It was the first event where the American President not only attended the ceremony but also presented the award, hence, amplifying the profile of the event. The first recipient of this award had been George Washington, followed by distinguished foreigners like Winston Churchill, Mother

15. Chiao, n. 13, pp. 56-59.

16. *Ibid.*, p. 63.

Teresa, Pope John II and Aung San Suu Kyi, to name a few.¹⁷ This decision and the whole event was denounced by Beijing as a move that seriously interfered in China's internal affairs, and damaged US-China relations.

UNDER BARACK OBAMA'S FIRST TERM OF PRESIDENCY

Obama's Meeting with the Dalai Lama

During Obama's first term of presidency, he was cautious not to antagonise or jeopardise US-China relations which was reflected in his decision to postpone his first meeting with the Dalai Lama until after his first trip to China. In September 2009, White House adviser Valerie Jarrett, along with Maria Otero, were sent to Dharamsala to inform the Dalai Lama that the president had postponed their first meeting until after his meeting with Hu Jintao in November. In October 2009, Secretary of State Hillary Clinton appointed Under Secretary of State for Democracy and Global Affairs Maria Otero as the special coordinator for the Tibet issues. Eventually, Obama received the politically sensitive guest in February 2010 in the Map Room not in the Oval Office, which would make it official. The first meeting between Obama and the Dalai Lama went on for an hour and as per the statement made by the press secretary of the White House, the President stated his strong support for the preservation of Tibet's unique religion, culture and protection of human rights for the Tibetans and commended the Dalai Lama's commitment to non-violence and pursuit of dialogue with the PRC.¹⁸

Some analysts mentioned that Obama conducted a positive but low key meeting with the Dalai Lama despite strong objection from Beijing, and the Obama Administration's decision to postpone the meeting with the Dalai Lama in September 2009 was viewed as a conciliatory move, leading up to the US President's first state visit to China.¹⁹

Obama met the Dalai Lama again after seventeen months in July 2011, in the Map Room, where they had a closed door conference.

17. Knaus, n. 11, pp. 287-288.

18. *Ibid.*, p. 296.

19. Thomas Lum, "U.S.-China Relations: Policy Issues", in Tracy M. Walton, ed., *U.S. and China Bilateral Relationship: Strains and Cooperation* (New York: Nova Science Publishers, Inc, 2011), p.16.

According to press accounts, the Dalai Lama restated his stand for self-rule rather than independence in Tibet, and Obama expressed strong support for direct talks and a resolution protecting both the Tibetans' rights and China's claim to the territory.²⁰

CONCLUSION

The US engagement with the Tibet issue has taken various forms since its initial engagement with the country in the backdrop of the Cold War. Similarly, its policy towards Tibet has evolved over time. Its initial policy towards Tibet recognised China's suzerainty over Tibet, largely conforming to Nationalist China's stand on Tibet. However, the triumph of the Communist Party in China and the outset of the Cold War led to a shift in the US' stand on the Tibet issue, to mainly being oriented towards containing Communist China. Driven by such objectives, the CIA's clandestine involvement with Tibet began. Furthermore, during the early years of Chinese occupation of Tibet, the US refused to recognise China's sovereignty over Tibet and it was only in 1978 that the US stated unequivocally that Tibet was a part of China, without mention of autonomy or the suzerainty link. A major policy shift occurred when rapprochement with China was achieved, that led to the Tibet issue being sidelined by the US. Interestingly, the Tibet issue came under the purview of the American public, particularly Congress, again in the late 1980s and Congress' support for the Tibet issue continues even today.

The stand of Congress, and the White House on the Tibet issue has not converged. Congress has always supported the Tibet issue, but, on the other hand, the White House has not endorsed Congress' views and, in fact, was more inclined towards strengthening its relations with China. Nevertheless, enactment of the Tibet Policy Act of 2002, creation of a special coordinator for the Tibetan issue, awarding of the Congressional Gold Medal to the Dalai Lama, and the US President's meeting with the Dalai Lama can be identified as robust engagement of the US with the Tibet issue, irrespective of the official recognition of Tibet as a part of China by the US Administration.

However, the dominant view is that in the backdrop of the growing economic and military might of China and economic

20. Knaus, n. 11, p. 297.

relations and trade taking precedence over other issues like human rights in Tibet, there is little hope that the US or any other nation will risk its relations with China to press it on the Tibet question. Given the fact that the US champions the cause of upholding and promoting democratic values, including human rights, and also being a superpower albeit in relative decline, it is best suited to exert pressure on China to promote these values.

Moreover, some analysts have advocated the need to include the Tibet issue in the US' grand strategy. They differ from the realist thinking and have brought the role of values and norms into the limelight. In the wake of the rise of China posing a major challenge to the US, there is a need for the US to focus much more on the Tibet issue. Some analysts have suggested that the Tibet issue must be made part of US strategic discussions with India, Japan and the Association of Southeast Asian Nations (ASEAN). It has been pointed out that the US Administration tends to treat the Tibet issue as a moral issue rather than as a strategic one. The first step in this direction would be to make sure that the US-India strategic dialogue touches on the Tibet issue. This can be substantiated further by ensuring that the US-India-Japan dialogues focus on the Tibet issue too.

Tibet, on its part, has exhibited to the world that it upholds democracy by having an elected Tibetan Prime Minister Lobsang Sangay. This development has generated certain advantage to the US, enabling it to say that it is dealing with a spiritual leader, hence, is not challenging China's sovereignty issues. Additionally, it has been opined that the Tibetan Prime Minister's engagement in strategic talks with foreign policy analysts and strategic thinkers in the US, Europe and Japan over the Tibet issue in the strategic context would be helpful.²¹

21. "Tibet and the Future of Asia: Strategic Issues for the U.S., India, and the World", *The Foreign Policy Initiative*, <http://www.foreignpolicyi.org/Tibet-and-the-Future-of-Asia>, May 4, 2012. Accessed on April 6, 2015.

THE DRAGON STANDS STRONG IN AFRICA: CHINA'S AFRICA POLICY

SHAHELI DAS

The dynamism of the contemporary relationship between China and the African subcontinent has fascinated and trapped the imagination of many observers around the globe. Although the two countries have had centuries long history of trade and international commerce, since the days of the Silk Road, formal establishment of diplomatic relations with Egypt, the first African country to recognise China, took place as late as 1956. As had been stated in the White Paper on China's Africa Policy (2006) , the principles of "mutual-benefit", "equality", "common development" and "mutual support" have been China's guiding principles towards its relationship towards Africa, for some time now.¹ However, the issue of China's Africa policy holds much greater significance at the present moment than ever before.

The year 2015 has been a watershed year in the Sino-African bilateral relationship. This is due to two fundamental reasons: the commencement of the sixth ministerial conference of the Forum of China-Africa Cooperation (FOCAC) which is scheduled to take place

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1. For more details, see *White Paper on China's Africa Policy* (2006), http://en.people.cn/200601/12/eng20060112_234894.html. Accessed on March 14, 2015.

in December 2015 in South Africa and the declaration of 2015 as the “Year of China” in South Africa.

Although ample scholarly work already exists on Sino-African relations, it caters primarily to two schools of thought: one school led by Chinese scholars who view China as a development partner of Africa and the second led by Western scholars who identify China as a neo-colonial power in the continent. However, through the course of this paper, an attempt has been made to seek answers to the following questions: Is the effect of the Beijing Consensus as opposed to the Washington Consensus gradually waning in Africa? What is the African perspective of China’s presence in the region? Is an emerging power like India a viable alternative to Chinese presence in the continent? Further, a constant reference will be made to the Western approach towards Africa in order to bring about a comparative analysis of China’s policy towards the continent.

The complex transformation in the international order and the mounting ambitions of countries across the globe have redefined international relations in the 21st century. As most countries seek recognition on a global platform, economic and strategic motives dominate their relations with each other. In this quest for economic security, the less developed nations which are rich in energy resources and were previously neglected, have now become the bone of contention amongst the developed and developing nations of the world. Such is the case with Africa, whose developmental challenges and strategic options are undergoing transformation owing to the shift of power from Euro-America to Asia-Pacific.

The rapid change in Sino-African relations, China’s growing presence in the region and the asymmetrical relationship shared by the two has attracted the attention of the world. Beijing’s role in Africa, quite popularly, has been categorised under three fundamental groups: Beijing as an economic competitor, as a coloniser and as a development partner.

WHY IS CHINA ATTRACTIVE TO AFRICA?

The African attraction towards China lies on three fronts. The transformation of China from a backward economy to one which has been able to eliminate absolute poverty stands in stark contrast to

the African economies, which have had to implement deflationary structural adjustment reform programmes under the strict monitoring of the US led International Monetary Fund (IMF) and World Bank. Such programmes offered a minimal role to the state and simultaneously crippled the productive sectors of the continent's economies. Consequently, the Beijing Consensus found greater appeal amongst the African masses than the Washington Consensus. Second, China appeared as a viable alternative to Africa's reliance on the West for development assistance, foreign investment and Western conditionalities. Third, pariah regimes in the African states of Zimbabwe and Sudan which have faced routine condemnation by the West, owing to their failure in governance and their bad human rights records, have found a stable strategic partner in China.

China's projection of its agenda of non-interference in the internal affairs of other states, its unpretentious nature of not claiming to 'civilise the natives', stands opposed to the Western demand of democracy, fair human rights record and calling Africa a 'dark continent' and the White man's burden. It is due to these reasons that China has greater appeal in Africa than the West.

A testimony to this bonhomie is the proliferation of Zimbabwe's Look East Policy, although no formal document outlining its tenets has been released so far.² Quite clearly, this is an alternative network to seek international economic and political support in the face of Western castigation of the Mugabe government. A number of Chinese language centres have also been instituted in several African states like Kenya and Nigeria. The motive behind the establishment of these centres is to facilitate linkage in the areas of trade and tourism, apart from the development of language skill which would in turn foster closer engagement between China and the respective African states.

IS THE CHINESE INFLUENCE IN THE CONTINENT ON THE WANE?

China and Africa are bound by the commonality in their political set-ups, that is, their non-adherence to democracy. However, the African regimes qualify under three major groups: weak democracies, pariah

2. Jeremy Youde, "The Active Pariah: Zimbabwe's 'Look East' Policy", *World Politics Review*, April 2, 2013, <http://www.worldpoliticsreview.com/articles/12825/the-active-pariah-zimbabwes-look-east-policy>. Accessed on March 20, 2015.

regimes and illiberal regimes.³ The core Chinese foreign policy motive towards its engagement in Africa remains economic development. This being the case, since energy is controlled by the state in the continent, the policy of China has been to forge ties with the elites at the government-to-government level and thereby gain access to resources. This engagement has led to only a few benefiting from the Sino-African partnership, abandoning the poverty ridden majority.

China is the biggest trading partner of Africa today as it had overtaken the US as early as in 2009. With an annual bilateral exchange of goods worth \$160 billion and migration of approximately one million Chinese traders and labourers to the continent, the influence of the Asian dragon on Africa seems immense.⁴ However, in spite of China's projection of its soft power strategy through funding of symbolic infrastructure projects such as construction of railways, the glittering headquarters of the African Union, and stadiums, its corporatist model of development is no longer viewed as a thriving opportunity.

The civil society in Africa is apprehensive of Chinese firms, their unfair deals, human rights violations, environmental damage and inequalities in terms of recruitment of the local African workforce and payment of wages. They seek greater transparency. Recent incidents like the blockage of a deal by the Senegal residents' organisation in which a section of property in Dakar was to be handed over to Chinese developers, and criticism voiced by African officials against China as an embodiment of a "new form of imperialism", portray such sentiments.

Such opposition and criticism from the African civil society is an unusual challenge for an authoritarian regime like China whose foreign policy is premised on state-to-state relations. It is in this gap between the Chinese leadership and the African masses that one can identify the influence of the Beijing Consensus gradually declining.⁵

The opportunity for emerging powers such as India and Brazil to enhance their imprint on the continent, redefine their relationship

3. Chris Alden, *China in Africa* (USA: Zed Books, 2007), p. 59.

4. Edward Voskeritchian, "China in Africa : One Among Many", *The Economist*, January 17, 2015, <http://www.economist.com/news/middle-east-and-africa/21639554-china-has-become-big-africa-now-backlash-one-among-many>. Accessed on March 19, 2015.

5. Ibid.

and seek Africa as an economic and, subsequently, a strategic partner, lies here.

INDIA'S ROLE?

Countries like India may offer the African nations an opportunity to experiment with alternative strategies of development.

India's affinity towards Africa is not a new phenomenon. It has been an ardent supporter of the anti-colonial struggle and the anti-apartheid movement in South Africa. The bonhomie in the relationship is a consequence of the changing geo-political dynamics of the post-Cold War era.

The intimacy in the Indo-African relationship is based on cooperation at various levels. Owing to vulnerability in the political situation in the Middle East, India has increasingly shown its dependence on Africa for its crude oil imports. Secondly, in the health sector, the Indian pharmaceutical division has offered support in terms of providing cheap anti-AIDS drugs to the continent. Thirdly, both sides seek multilateral cooperation. South Africa, a constituent of the African Union, has sought active engagement with India in multilateral forums like Brazil, Russia, India, China, South Africa (BRICS) and India, Brazil, South Africa (IBSA). They hold analogous positions on issues of poverty reduction, climate change and in the World Trade Organisation (WTO). Fourthly, since both countries are host to huge poverty-ridden populations who are distressed by the issue of food security, there is scope for cooperation on this front as well. India can provide assistance to Africa to develop its agriculture and fishery sectors.⁶

Apart from these areas of cooperation, the security concerns of both India and the African Union converge at several points. There is an interesting similarity in the myriad internal and external challenges that they face, namely, internal threats like possession of illegal weapons, theft, assault and murder. Like India which is daunted by external threats from Afghanistan, Pakistan and the Maoist insurgency in Nepal, for Africa, the anticipation of the repercussions

6. Arvind Gupta, "India Africa Relations in the Changing Geo-Political Environment", in Ruchita Beri, ed., *India and Africa: Enhancing Mutual Engagement* (New Delhi: Pentagon Press, 2013), pp. 22-23.

of war in the neighbouring countries leading to regional instability is a constant source of intimidation. Further, there are two other areas of concern.

Safeguarding the Indian Ocean is the primary concern. It is considered as one of the major routes for global trade and also identified as the 'hotspot of piracy'. This region is of key concern to Africa as it transports its supply of natural resources to foreign countries like China through this route. The Indian Navy, on its part, has undertaken several anti-piracy operations in the Somalian waters to keep the Indian coast free of Somalian pirates.⁷ Owing to the transit of Indian imports worth \$50 billion and exports worth \$60 billion through the Gulf of Aden, the Indian government aims to undertake strong anti-piracy missions in this region. Measures such as merchant ships being escorted by Indian naval ships along the length of the Internationally Recommended Transit Corridor (IRTC), have been adopted. The second security issue is that of international terrorism. There has been rising concern regarding the trafficking of drugs and narcotics across the world. There is much apprehension regarding the presence of such groups from Africa conducting drug trafficking in India. This showcases that despite altered contexts, the underlying security threats remain the same.

Despite these areas of similarity, when one delves deep into India's foreign policy in Africa, it is found that like China's, India's underlying motive behind its engagement with Africa is to fulfil its economic and strategic interests. India is an emerging power on the horizon of the international arena, therefore, more than ever before, it seeks to establish and sustain its position as a significant global economic power and, consequently, fulfil its dream of becoming a global power in the near future.

However, if an analogy is drawn between the strategies of China and India on the African continent, it is found that their influence is not identical. China's investment in the region is comparatively more aggressive than India's and is dominated by state-owned enterprises which enjoy financial and political support to undermine the influence of other competitors in the market. On the contrary, the Indian investment in Africa is private sector driven and does

7. Ibid.

not get much political and financial support from the state.⁸ Further, owing to the perception of the Chinese threat to India's investment in the African market, the Indian government has sought deeper engagement with the continent through programmes such as the India-Africa Partnership Project and Focus Africa Programme. Similarly, the importance that African countries have conferred on India may be inferred through instances like 'Exercise Blue Crane' in 1999 where India was the only foreign country to receive an invitation for the event.

As 'Africa Looks East', India appears to be the only viable alternative to the Chinese presence in the region. With the new government coming to power at the Centre in India in 2014, under the leadership of Shri Narendra Modi, the chances for the establishment of a new strategic engagement between the two countries seem to be bright. The Modi led government follows a foreign policy which is essentially based on commercial diplomacy. Such being the case on one side, and African natural resources and oil being of key importance to India's rise in the global economy, on the other, there are chances of a more active engagement between the two sides. India has made its presence felt in the region through its steel, mining and telecommunication companies, but, due to lack of foresight and incapacity to pursue a meticulous foreign policy strategy, the road before it to broaden the scope and strategy of engagement with the continent is a still a long one.

SHIFT IN CHINA'S AFRICA POLICY

Despite the meteoric rise of China and the China threat theory doing the rounds in the scholarly circles around the world, China's Africa policy under President Xi Jinping seems to be an answer to this much discussed theory. China's engagement with Africa must be viewed in the larger context of its 'peripheral diplomacy' that was announced by President Xi in the Central Conference on Work Relating to Foreign Affairs.

In this second decade of the 21st century, quite clearly the balance of power in the international arena has undergone a significant shift,

8. Fantu Cheru and Cyril Obi, "Introduction: Africa in the Twenty-First Century: Strategic and Development Challenges", *The Rise of China and India in Africa* (New York: Zed Books 2010), p. 3.

from a unipolar world to a multipolar world. As a consequence to the change in the structure of the world order, the rising and emerging powers have altered their strategies towards their targets. Similarly, China's policy in Africa has shifted from 'resource grab' to a mutually beneficial relationship. However, the underlying imperative of China's foreign policy towards both Africa and other countries of the world continues to focus on seeking economic gain and commercial benefit.

China's foreign policy too, under the leadership of President Xi Jinping has undergone a sea-change from its traditional past. It has emerged from Deng Xiaoping's policy of "lie-low" and projected itself as an assertive power. It has engaged with African security issues at a new level such as breaking away from its age-old principle of "non-intervention" in the internal affairs of other states, and intervening in the civil strife in Sudan through the medium of direct mediation. Further, shortly after Xi had taken over China's leadership, Beijing had made an unusual move of dispatching combat troops from the Special Forces of the People's Liberation Army (PLA) to the United Nations peace-keeping mission in Mali – a measure that had never before been adopted by the Chinese leadership.⁹

A recent milestone in the Sino-African relationship concerns the Ebola outbreak in West Africa, namely, Liberia, Sierra Leone and Guinea. The epidemic was declared a threat to peace and security by the United Nations Security Council in September 2014. Both the West and China tried to initiate measures to curb the crisis, but the assistance offered by China was observed as being the largest in the history of China, in terms of its response to global non-traditional security crises.

China's health diplomacy in the continent demonstrated three clear strands of thought: its desire to project itself as a responsible stakeholder in the international arena; its objective to protect its investments in West Africa; and, thirdly, its attempt to hedge the presence of other foreign powers like India, Brazil and the West on the African territory. This, together with the rising displeasure of the civil society in Africa, has compelled China to develop new strategies to earn the goodwill of the masses.

9. Yun Sun, "Xi Jinping's Africa Policy: The First Year", *Brookings*, April 14, 2014, <http://www.brookings.edu/blogs/africa-in-focus/posts/2014/04/10-jinping-africa-policy-sun>. Accessed on March 24, 2015.

Further, the much discussed subject of “One Belt One Road” in China’s foreign policy realm holds significance for Africa too. Although the Maritime Silk Route covers only the coast of northeast Africa at present, it is contemplated that synergy and goodwill in the relations will definitely have a spillover effect on the rest of Africa. The Chinese claim that the Silk Route initiative would offer thriving employment opportunities to the local African workforce, which, in turn, would contribute to the national income of the African countries. The motive behind these measures being undertaken by President Xi is to showcase China’s affinity towards deeper engagement with Africa.

The recent trends in China’s Africa policy have caused much suspicion and stir in the foreign policy circles of the West. In view of the concrete initiatives undertaken by China, the West too has made efforts to not remain far behind in pursuing its interest in Africa. However, to the discredit of the West, it may be stated that, it was as late as in 2012 that the US drew up a strategy towards Sub-Saharan Africa.¹⁰ This initiative was taken in the wake of the growing Chinese presence in the continent. Hosting of the US-Africa leaders summit in August 2014 in Washington, together with the launching of programmes like African Growth and Opportunity Act (AGOA) and Power Africa may be cited as certain significant steps taken by the US towards developing closer ties with Africa.

However, despite substantial steps adopted by other foreign powers like India and the US to establish their footprint on the continent, China remains a step ahead of the rest.

CONCLUSION

Having discussed China’s approach and influence in Africa through a comparative approach, it can be concluded that a host of factors has contributed to China leading from the front. There is a latent realisation within the African people that China definitely has a role to play in the renaissance of the African economic boom. On the other hand, it may also be put forth that, in spite of bilateral ties being in place for centuries, India and the USA have sought active engagement

10. “US President Barack Obama Unveils US Africa Strategy”, *BBC*, June 14, 2012, <http://www.bbc.com/news/world-africa-18448612>. Accessed on March 24, 2015.

with Africa only recently. There are two reasons behind such state of affairs: first, the distinguished public presence of China in the region, and, second, to promote China's national interest and in order to use its national power to its own advantage.

Further, the disregard of African civil society and the elite leadership for the West owing to their disenchantment with the West's double standards in terms of aid assistance and unfair trade practices, has worked in favour of China. Both China and India have, unlike the West, hailed the aspect of common prosperity and identification of Africa as being on the verge of developmental take-off and have earned the goodwill of the African people.

On the economic front, whereas India anticipates a figure of \$100 billion trade with Africa in 2015, the Chinese anticipation is to reach the \$300 billion mark.¹¹ The volume of trade between the West and Africa is less than double that of China with the continent. The figures clearly suggest that China's trade has dwarfed that of India and the US or any other potential competitor in the region. It also indicates the deep entrenchment of China into the African economy. Since the economy is the underlying basis for expanding political and military influence in the continent as well as in the international sphere, quite clearly, China's case stands strong in the continent. Though the dissatisfaction of the civil society suggests the waning of the Beijing Consensus, it continues to be the ruling ideological, political and economic force in Africa due to lack of an effective alternative competitor in the region.

The time is ripe for strategists in Africa to identify the areas that would offer it maximum economic profit and, thereby, deduce a foreign policy strategy suitable to its national interest. It is highly desirable for Africa to realise its global ambitions, come out of the shadow of China and experiment with other development partners, which, in turn, would offer it greater bargaining power and an ability to derive greater benefits from its engagement with a rising China.

11. Li Jiabao, "China-Africa Trade Expected to Hit \$300 Billion in 2015", *China Daily*, November 29, 2013, http://usa.chinadaily.com.cn/business/2013-11/29/content_17141501.htm. Accessed on March 24, 2015.

A PARADIGM SHIFT: DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION TO DELIVER

MANOJ KUMAR

This paper searches for practices and mechanisms that would make the Defence Research and Development Organisation (DRDO) a more productive Research and Development (R&D) organisation. It applies the McKinsey 7-S framework on studying and managing change in the organisation to achieve the goal set out for it by the government. The recommendations are based on key gap areas noticed during the framework application process. Finally, it has been demonstrated that a semi-autonomous DRDO organisation would be better able to meet its R&D goals. The key to performance would also be the emergence of a competitive landscape in defence R&D.

The subject of this paper is a pointer to the perception that the author has on the working of the Defence Research and Development (DRDO). There is no solace in substantiating this perception by the fact that even the Prime Minister has been quoted similarly, which is a pointer to this position. The reasons may be many but the bottom

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line is that DRDO has not delivered to its potential! This is a fact that may be grudgingly accepted by even the diehard DRDO loyalist. This paper is meant to suggest some good practices, which may turn around the brand value of DRDO by making its performance at par with the best Science & Technology (S&T) organisations in the world. This is not only for the sake of commercial efficiency but also for far more serious strategic reasons of national security. At the outset, it should be pointed out that the author would not be writing this from the point of view of a user the [Indian Air Force (IAF)] but as an academic, studying Research and Development (R&D) management in DRDO (and the Ministry of Defence); thus, any biases noticed are inadvertent.

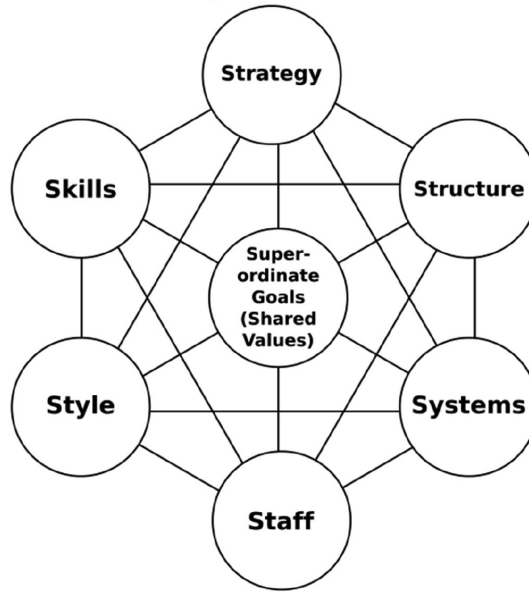
The suggested improvements and changes in the functioning of DRDO can happen only if the lacunae are accepted and analysed. This is normally the starting point of any improvement exercise. A quick rundown of the DRDO organisation is essential to provide a perspective on the case. DRDO executes R&D programmes, and undertakes development and evaluation of various systems and products required by the three Services. It has 52 labs working in different areas of technologies viz. aeronautics, armaments, electronics, combat vehicles, engineering systems, instrumentation, missiles, advanced computing and simulation, special materials, naval systems, life sciences, training, information systems and agriculture. Presently, the organisation is backed by over 7,500 scientists and about 21,000 other scientific, technical and supporting personnel.¹ It is spread across the length and breadth of the country.

The change management theories suggest that normally there are many interconnected factors that are drivers and consequences of any change. The 7-S framework by McKinsey² is an ideal tool to analyse and suggest changes in the working of DRDO. It will provide nodes in the architecture of the study process and, thus, anchor the discussion. The nodes in the 7-S framework are: Superordinate goals, Structure,

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1. R.P. Singh, "DRDO in 2021: HR Perspectives," *DRDO Science Spectrum*, March 2009, <http://drdo.gov.in/drdo/pub/dss/2009/main/44-CEPTAM.pdf>. Accessed on November 14, 2014. This is from an article published in *DRDO Science Spectrum* in March 2009. The figures may, thus, vary a little.
 2. Alexander Michalski, *The McKinsey 7-S Framework: Invented in the 1980s and Still a Possibility for Success Today* (Munich: GRIN Verlag, 2011).

Strategy, System, Staff, Skills, and Style. These are interconnected and for any change to be successful, these Ss are to be in harmony. Unilateral change management in any one 'S' is infructuous as change in one causes change in another. Please consider Fig 1 below.³

Fig 1: McKinsey 7-S Framework



THE STUDY

Superordinate goals are the core around which the organisation exists. These are more than mere articulation of the mission statement. DRDO's tag lines are "Arming India's Defence Forces", "Dedicated to Nation Building" and "Building Self-Reliance in Defence".⁴ These are lofty goals and the core is, indeed, helping the nation to be developed and self-reliant. Considering that India is the leading global arms importer in the world,⁵ this goal is far from achieved. The goal itself

3. <http://www.comindwork.com/weekly/2015-02-02/productivity/mckinsey-7s-framework>. Accessed on March 20, 2015.
4. DRDO Website, <http://www.drdo.gov.in/drdo/English/index.jsp?pg=homebody.jsp>. Accessed on November 15, 2014.
5. Jennifer Ginsburg, *Arms Control and Proliferation Profile: India*, Arms Control Association, updated February 2015, <http://www.armscontrol.org/factsheets/indiaprofile>. Accessed on November 14, 2014.

per se is fine and all the other Ss should be in harmony to help achieve it. But is the stress on achieving the goal high enough? In 2010, Indian investment in DRDO was 7 percent of the nation's defence budget at Rs 98 billion. This is not a small sum for a country that invests only 0.88 percent of its Gross Domestic Product (GDP) in R&D.⁶ So the goal is correctly defined and understood by the organisation. All personnel within and outside the organisation appreciate this goal too. It is now required to study if the other interconnected nodes support this goal.

The **structure** defines the formal reporting relationship. The DRDO's structure is at present divided based on the core technologies that the labs deal in. In all, there are 10 clusters of labs controlled by 7 Director Generals (DGs). The structure is fairly elaborate⁷ and contains many hierarchical layers. Only about 25 percent of the total workforce (approximately 28,000) are scientists and many of them perform an administrator's job. In such a scenario, the total number of scientists actually working hands-on, would be much less than 25 percent of the total. Now compare this figure with that of the Fraunhofer Society in Germany that undertakes research in many civil and defence technology areas. With 60 institutes in Germany, the society employs 22,000 personnel, a majority of whom are scientists and engineers. The annual research budget is €1.9 billion (about Rs. 127 billion). Of this sum, more than €1.6 billion is generated through contract research. Two-thirds of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects. The German federal and Länder governments contribute only one-third of their budgets in the form of institutional funding.⁸

It may be clear now that an overtly layered structure, which in government parlance translates into a bureaucratic set-up, is taking away the teeth from research in DRDO. Its annual budget is about €1.27 billion, all contributed by the government and this seems to be

6. *India's Growing Defence Industry Base*, *Defence Review Asia*, November 1, 2010, <http://www.defencereviewasia.com/articles/55/India-s-Growing-Defence-Industry-Base>. Accessed on November 15, 2014.

7. *Technology Based Clusters*, September 24, 2013, http://www.drdo.gov.in/drdo/English/Organization_Chart.pdf. Accessed on November 15, 2014.

8. *German Centre for Research and Innovation*, <http://www.germaninnovation.org/about-us/gcri-partner-institutions/fraunhofer-gesellschaft>. Accessed on November 15, 2014.

another problem. This budget is not small even by Western standards but the productivity is nowhere near those standards. Thus, DRDO, as overly budgeted (vis-à-vis the output) and overly structured are two issues that have emerged till now in the study.

Strategy is the next node of study. While strategy here is narrow in a sense, it is applied to see how the organisation is aligned in achieving the superordinate goals. The major focus of the organisation should be R&D. The state of technological growth in the country requires leapfrogging certain stages of R&D lest we take another 30 years to develop a Light Combat Aircraft (LCA). The DRDO website does not have one piece of information to show where DRDO is partnering foreign labs in the collaborative development of technology. This could be due to two reasons. One, being a defence lab, collaborating with foreign labs is not easy and requires governmental tie-ups. Two, the level of research in DRDO is not of the standard that a major foreign lab would be interested in partnering. As compared to this, the Fraunhofer Society is even tying up with major Israeli industry to strengthen its ties with their labs, acknowledging the superiority of Israeli R&D.⁹ In any event, this can be construed as a major shortcoming considering that one of the success stories of DRDO is the Brahmos missile, which was developed by collaborative R&D with Russian labs. Why has this model not been repeated more often with other Western labs is a question that needs to be asked. There may be a few cases of such collaboration but the outcomes have to prove the point in the long run and this is where the strategic thought process is important.

System comprises rules, processes and procedures. With the aforementioned changes envisaged in the structure and strategy, it is important that the system would also have to be commensurately changed. However, the present system in DRDO works on the principle of a normal central government department that sits like a monolith. This is a pointer to the straitjacketing of an R&D organisation. Whether this would lead to lower research productivity, is not in doubt. Certain broad guidelines are certainly needed for streamlining the running of any organisation but a government department system can definitely not be the best for an R&D set-up. Within the

9. Ibid.

government system, can a separate set of rules and procedures be laid down for any department? There are various models that permit such a system to be put in place. All of these would mean some breakage of the symbiotic linkages between the administrators sitting in Delhi and the labs dispersed all over the country. Also, with this breakage would come less financial support and, accordingly, the DRDO labs would have to develop self-sustaining strategies. The present-day linkages are so crossed with financial backing that considerable time and energy have to go into disbursement and monitoring.

Staff is acquiring, placing, training and developing the right Human Resource (HR) for the organisation. DRDO has a vast pool of scientists that it sources from various universities in India. Although there is no public source which reveals who the primary feeders are, a cursory check across various discussions sites on the internet and discussions with the present inductees of DRDO, reveals clearly that the engineers from the top universities, Indian Institutes of Technology/ Indian Institutes of Science/National Institutes of Technology (IITs/ IISc/NITs, etc) think of it as a last resort and mostly as a stepping stone before they move on to “better” pastures. DRDO visits their campuses in February every year, by the time the placements in these premier institutes are over. Actually, the biggest stumbling block in acquiring quality engineers/scientists is the perception of the students that in a government department mired with the ‘system’, R&D is not possible. Even if the research results are positive, what recognition would be bestowed upon the inventor? The earnings come as a distant third in this ‘motivation to join’ process. Are these the reasons why the Indian Space Research Organisation (ISRO) – an organisation seen to be delivering—set up its own engineering college in 2007 with a unique model of intake? At present, just 2 percent of ISRO’s engineers come from IITs and NITs.¹⁰ Universities like the Defence Institute of Advanced Technology (DIAT), Pune, which work within the structure of DRDO, should be the normal feeders to the organisation, but this does not happen. The latter is a separate subject to be explored and beyond the coverage of this paper.

10. PayalGwalani & AdarshJain, “Just 2% of ISRO’s Engineers are from IITs, NITs.” *The Times of India*, September 26, 2014, <http://timesofindia.indiatimes.com/home/education/news/Just-2-of-Isros-engineers-are-from-IITs-NITs/articleshow/43458127.cms>. Accessed on November 15, 2014.

After discussions with a few scientists, it emerged that the training in DRDO is not a well-planned strategy. This does not imply that training does not take place, but it is not a need-based approach that is the norm here. Thus, a scientist joining DRDO normally develops with his own initiative rather than an organisational strategy. The development to take on various research tasks, thus, suffers. Cutting edge research is not possible in these circumstances and what emerges is that over time, a reverse-engineering aptitude may develop. The development actually takes place in the private industry, which undertakes most of the subsequent manufacturing on behalf of DRDO. The **staff** function, thus, has a lot to do with the competency gaps, which are evident from the quality of research coming out of DRDO labs.

Skill is the distinct competence by which people come to characterise an organisation. R&D is not a skill set that is normally associated with DRDO, which is a huge dichotomy. Its identity is more as a department under the Ministry of Defence (MoD). It is clear, as given earlier in the paper, that this is because no big-ticket developments emerging from DRDO labs have yet come to the people's notice. Many development efforts are mired in controversy with the users. Even the few good developments are not sold to the common man, to make the scientists' job "glamorous". It is no wonder that the government is looking hard at an R&D budget of more than a billion dollars for DRDO when its skill identification is not what should be its distinct competency – research and development. The skill set is not in harmony with the other Ss. **This has to be the driver of change for the top management.** For developing this, the requirement would be to bring changes in the other Ss of the framework as would be recommended later in the paper.

Style is the pattern of actions of the top management and, indeed, the culture of the organisation. This brings the people element into the discussion and is a complex issue. An R&D organisation has to be based on goals that are slightly stretched, controlled but not draconian, performance-oriented but not overly zealous, and finally, accountable for the quality of output. On all these fronts, DRDO leaves one wondering! The performance and accountability culture is so thin that even with the low quality of research output, funding

has not been affected, promotions are not stalled, and, in fact, service extensions are given quite often after the normal retirement age. National security imperatives have resulted in placing the staff of DRDO on a different pedestal. Of course, the feeling within DRDO is that their deliveries are affected by the attitude of the users who want everything 'yesterday'. This lack of communication between the two has resulted in DRDO working in a cocoon like position, rationalising the lack of, or delayed, output. This culture needs to be changed, that is obvious, but this is true for many other government departments as well. It again points to the same positions that have been faced while discussing structure and strategy above.

THE WAY AHEAD

After studying the 7-S framework applied on DRDO, now is the time to answer the hard questions asked and the bitter truths outlined above. The recommendations given below require a strategic thought process rather than a narrow turf and prismatic view.

- DRDO needs to be made a semi-autonomous body. The structure and legalities are workable but what is essential to understand is that DRDO needs to become self-reliant to a large extent in undertaking research projects and receiving grants. It already has an impressive lab infrastructure provided by the government.
- DRDO needs to face competition in the field of defence research from the private and other government labs. The government needs to be seen as a provider of seed money to the best R&D organisation that can deliver a particular project and then carry it forward. The defence infrastructure in the country needs to tap external as well as internal assets (within the MoD) – one that delivers.
- DRDO has to greatly change its manning structure to have more teeth (scientists) and less tail (support staff). Many hierarchies of the structure are a hindrance in deliveries (decision-making), symbolic of a government department and not an R&D organisation. With autonomous structuring would come the flexibility to not follow government departmental norms of the organisational set-up.
- With more strategic freedom, performance premium, and accountability, DRDO should undertake to change its staffing

function. It should recruit from the best, even at lateral levels, upon visualising a competency gap. The desired skill set should be the criteria for acquiring the Human Resource (HR) and not filling vacancies. The promotions should be performance-based akin to what is followed in the corporate world. Papers published in journals should not be considered the last criterion of suitability. However, even here, DRDO does not really come up trumps. Only 90 scientists contribute 94 percent of the papers written by DRDO. The foreign collaborative papers are only a handful.¹¹

- The training programmes have to be based on competency gaps in each technology field. DRDO should consider foreign training programmes (with necessary safeguards) for enhancing the levels of knowledge and its application.
- The recommendation of a semi-autonomous structure (as given above) was made keeping in mind that the government would still be funding a lot of the work and would also be the biggest beneficiary. However, the intellectual property rights can be decided upon jointly, depending upon the technology involved. This would also enable DRDO to undertake collaborative R&D projects with foreign labs, not necessarily on defence technologies but those that have a wide innovative appeal. All such research projects would add to the core competence of the organisation. The context has to be clearly understood here.
- Rules and procedures would have to be changed as per the changed format suggested above. The pay and emoluments of the scientists would have to be based on principles of skill demand and supply, much like in the corporate world.
- Communication between the users and R&D department is vital. There is a paralysis of sorts in this area with a lack of trust apparent. DRDO has to be a responsive organisation and break out of its shell to engage the customers with more boundary spanning activities. However, it is felt that once the changes

11. Lalitha Koti, Kannapanavar B U and Prasad N N, Research Output of Defence Research and Development Organisation (DRDO) India, *e-Library Science Research Journal*, January 2014, <http://www.lsrj.in/UploadedArticles/184.pdf>. Accessed on November 16, 2014.

envisaged above are put in place, they would act as a driver for improving the two-way communication between the users and DRDO.

THE PROCESS BEGINS...

The recommendations suggested here may require more customisation to suit the field of defence. These are policy level changes, which go beyond managing the process internally from within DRDO. The process has to start because self-reliance in the field of defence related technologies is a goal that has much wider implications than only saving foreign exchange or enhancing the industrial base. The process requires that, to an extent, DRDO should be based on a corporate model. However, it stops short of outright privatisation because that too is not desirable for defence R&D work.

DRDO has not really gone in a mission mode for finding research solutions for the Services. The result is a lack of trust with its customers – the three Services. Since all are government departments under the same ministry, a culture of accountability has not set in. The structure, thus, needs to be changed from the foundation itself. This is also true for other similarly placed non-R&D organisations like the Ordnance Factories (OFs). Only a competitive mindset would stretch the goal wherein a performance culture would become the norm. This mindset would come about as and when the government allows other market players to move in too, with their R&D proposals.

The 7-S framework allows one to see the areas which are not in line with the superordinate goals. The change management starts with this identification and then goes on to building harmony between all these nodes of the framework. Bringing changes in an old monolithic government department like DRDO and the strategies of the controlling ministry may be a difficult proposition but if the government wishes to consider the long-term goal of making India a technological leader, then such change has to be initiated forthwith. The potential of DRDO is such that it can push India ahead not only in the defence arena but also in dual use technologies.

THREAT FROM ELECTROMAGNETIC PULSE ATTACK: EVOLUTION, INTENTIONS AND EFFECTS

ASHISH GUPTA

North Korea's ascendancy in the league of nations capable of launching satellites and its successful foray into developing nuclear weapons have brought to the fore the requirement of reevaluating the threat emanating from the use of nuclear devices causing an Electromagnetic Pulse (EMP) event. Reportedly, South Korean military intelligence concluded that Russian scientists are in North Korea, helping in the development of a super-EMP warhead. In 2012, it was stated by a Chinese military commentator that North Korea is in possession of super-EMP nuclear warheads.¹ With all-pervasive use of electronic-based equipment, computers and devices, with their tentacles encompassing and entwining almost all the facets of the world's commercial, military and political activities, even a limited disruption can become cataclysmic, cascading through connected systems. The potential threat of EMP used as a weapon poses a significant risk to the security of nations. Understanding the extent of these risks will help in initiating steps to mitigate them.

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1. Peter Vincent Pry, "North Korea EMP Attack Could Destroy US", *Washington Post*, December 19, 2012, <http://www.washingtontimes.com>. Accessed on April 20, 2015.

Nuclear explosions, irrespective of the medium of explosion (underground, under a water body or at high altitudes) are always accompanied by an EMP. The intensity, duration and effective area of the EMP are dependent on the location of the burst point. The nuclear EMP comprises time varying electromagnetic radiation which ascends to its peak value very rapidly and then decays somewhat more slowly. The radiation produces very broad spectrum frequencies, ranging from very low to several hundred megahertz, however, most frequencies so generated, are mainly in the radio frequency region. A nuclear bomb explosion at high altitude will interact with the earth's atmosphere, ionosphere and magnetic field to produce an EMP radiating to the earth. The EMP produces effects which are both direct and indirect: the former due to electromagnetic "shocking" of electronics and stressing of electronics systems and the latter due to damage to the electronics controls which, in turn, damage the systems in which they are embedded.

A nuclear explosion is always accompanied with the emission of nuclear radiations. These radiations consist of gamma rays, neutrons, beta particles and a small proportion of alpha particles. The bulk of the neutrons and part of the gamma rays are emitted simultaneously with the explosion. The remainder of the gamma rays are produced in various secondary processes, including decay of the fission products. The primary instantaneous (prompt) gamma rays are added upon by secondary gamma rays produced by neutron interactions with weapon residues or the surrounding medium. This phenomenon gives rise to EMP. The gamma rays interact with air molecules and atoms, mainly by the "Compton Effect" and produce an ionised region surrounding the burst point. The negatively charged electrons move outward faster than the much heavier charged ions and, as a result, there is initially a separation of charges. This separation of charges produces an electric field which can attain its maximum value in about 10^{-8} seconds, i.e., a small one in a few tens of microseconds. By focussing on three major EMP components, a better understanding can be elucidated.²

- **First EMP Component (E1):** The first component i.e. prompt gamma EMP (E1) is an energy pulse with a rise-time in the range

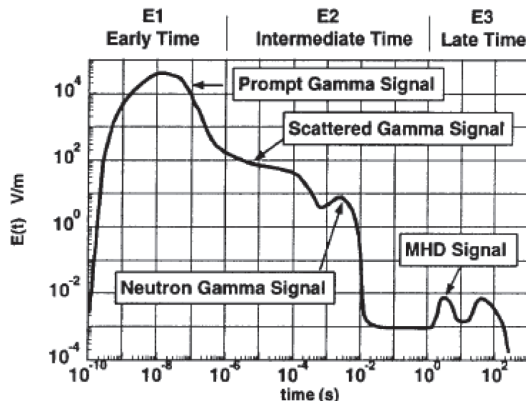
2. US Department of Defence, *Electromagnetic Environmental Effects: Requirements for Systems*, MIL-STD-464 (Falls Church VA: Department of Defence, 1983), p. 60.

of a fraction of a nanosecond. The resulting “electromagnetic shock” is capable of causing disruption or damage to electronic devices in various sensors, communication systems, control systems, computers, allied equipment and similar devices. The damage or functional disruption by the first EMP component occurs simultaneously over a very large area.

- **Second EMP Component (E2):** The second EMP component (E2) or scattered gamma EMP has a geographic coverage area roughly with the same dimensions as the first component. It is similar to a lightning strike in its time-dependence, however, geographically, far more widespread but relatively lower in amplitude.
- **Third EMP Component (E3):** The last component of EMP is a pulse of longer duration and slow rise time, capable of inducing disruptive currents in long electricity transmission lines capable of damaging electrical supply and distribution systems connected to such lines. The sequence of the E1, E2 and E3 components of EMP is significant as the damage at a later stage is exacerbated due to damage at the earlier stages.

Fig 1 depicts the field strength of three major EMP components in relation to time in a diagrammatic form.

Fig 1: EMP Environment (E1, E2 and E3)



Source: US Department of Defence, *Electromagnetic Environmental Effects: Requirements for Systems*, MIL-STD-464 (Falls Church VA: Department of Defence, 1983), p. 60.

The weapons designed and deployed with the intent to generate electromagnetic fields produce EMP to cause debilitating disruption or damage to electrical power systems, electronics and information systems. The quantum of damage to electrical or electronic systems due to EMP energy will be directly proportional to the amount of energy collected over a considerable area by means of a suitable conductor. This energy is then dissipated from the collector (antenna) in the form of a strong current and voltage surges to the attached equipment. The equipment does not have to be directly attached to the collector; the EMP energy can be coupled by electric or magnetic induction also. The ubiquitous usage of modern solid-state circuitry (ICs), which replaced the erstwhile vacuum-tube technology of 1962, has radically increased the vulnerability of electronic equipment to the E1 pulse. The internal architecture and components used in modern ICs make them about a million times more susceptible to E1 pulses in comparison to electronics of the early-1960s vintage. During test simulations on the effect of EMP, it was found that a short pulse of the order of 10^{-7} joule may be sufficient to cause damage to a microwave semiconductor (MIC) device. An audio transistor will suffer functional damage when subjected to a short pulse of roughly 5×10^{-2} joule, but as much as 1 joule would be required to cause damage to the vacuum tube.

The detonation of a nuclear device at a given altitude can generate significant EMP levels at the earth's surface, which can be quantified in terms of coverage area factoring in the tangent radius (R_t). The tangent radius is measured in relation to the line of sight from the burst, where it is tangent with the earth's surface. For an approximate earth radius of 6,371 km, a Height of Burst (HOB) of 100 km corresponds to an R_t of 1,121 km, a HOB of 300 km corresponds to an R_t of 1,920 km, and a HOB of 500 km corresponds to an R_t of 2,450 km.³ Thus, the EMP generated by a nuclear explosion at an altitude of 100 km would illuminate all the major cities and establishments of India, as depicted in Fig 2. The calculations have been based on computational methodology

3. US Army Corps of Engineers, *Electromagnetic Pulse (EMP) and Tempest Protection for facilities* (Washington DC: US Government Publishing Office, 1990), http://www.usace.army.mil/inet/usace-docs/eng_pamphlets/ep.htm. Accessed on April 20, 2015.

widely adopted for marking area covered by EMP from nuclear detonations at various HOBs.

Fig 2: Coverage of Geographic Area by EMP Generated by a Nuclear Explosion at 100 km



Source: US Defence Nuclear Agency, *Capabilities of Nuclear Weapons*, DNA EM-1 (Washington DC: Defence Nuclear Agency, 1981), pp. 71-72.

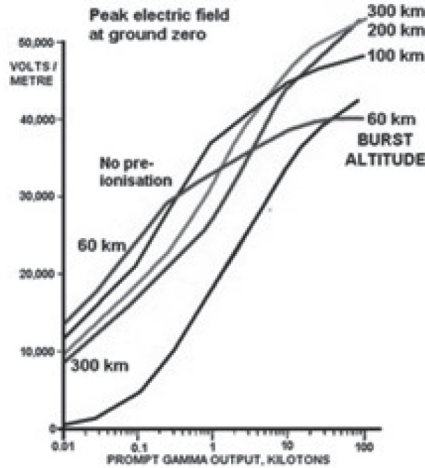
The peak EMP on the ground is a function of burst altitude. While computing the electric field intensity, the yield taken into consideration is the prompt gamma ray output measured in kilotons.⁴ Depending on weapon design, the prompt gamma ray output varies from 0.115-0.5 percent of the total weapon yield. The “1962 Starfish Prime Test”, a total yield of 1.4 megaton had a gamma output of 0.1 percent i.e. 1.4 kiloton of prompt gamma rays. In a fission explosion, the total prompt gamma ray energy is 3.5 percent of the yield. However, in a 10 kiloton detonation, the triggering explosive around the bomb core absorbs about 85 percent of the prompt gamma rays, limiting the output to about 0.115-0.5 percent of the yield.⁵ Although, thermonuclear weapons are less efficient at producing EMP because the first stage can pre-ionise the air which becomes conductive and, hence, rapidly shorts out the Compton currents generated by the

4. Louis W. Seiler, Jr., *A Computational Model for High Altitude EMP* (Ohio: Air Force Institute of Technology, 1975), p.21.

5. Ibid.

fusion stage, the geomagnetic storm-like E3 component of nuclear EMP is more closely proportional to the total energy yield of the weapon. Hence, thinly cased small pure fission weapons are far more efficient at causing EMP than most megaton bombs.

Fig 3: Peak Electric Field as a Function of Burst Height



Source: Louis W. Seiler, Jr., *A Calculational Model for High Altitude EMP* (Ohio: Air Force Institute of Technology, 1975), p.21.

The observance of the effects of nuclear EMP and collation and correlation of related data is limited as not all the data is in the public domain. Between 1955 and 1962, a total of about 20 US and Soviet tests took place (13 tests conducted by the US and 7 by the Soviets). Many of these were megaton-range weapons, making the process of interpolation to lower yield weapons difficult. Besides, the tests were conducted in the period when modern electronics was yet to make its commercial foray into the field of electronics in big way. Consequently, it is difficult to gauge the effects they may have had upon sensitive modern electronics, and this can only be postulated upon, based on simulations.

US TESTS

A lot of valuable information can be gleaned from the results of the American Cold War era high-altitude tests compiled in a publicly

available document entitled, "US High Altitude Test Experiences,"⁶ which states: "Starfish produced the largest fields of the high-altitude detonations; they caused outages of the series-connected street-lighting systems of Oahu (Hawaii), probable failure of a microwave repeating station on Kauai, failure of the input stages of ionospheric sounders and damage to rectifiers in communication receivers. No failure was noted in the telemetry systems used for data transmission on board the many instrumentation rockets. The failures observed were generally in the unprotected input stages of receivers or in rectifiers of electronic equipment; transients on the power line probably caused the rectifier failures."⁷

SOVIET TESTS

The most serious ramification of the Cold War between the United States and the Soviet Union was an unprecedented and unabated race for development, acquisition and proliferation of nuclear weapons. The Soviet high-altitude nuclear tests called "K" Project was a group of five nuclear tests conducted during 1961 and 1962. The first two of the Soviet "K-Project" high-altitude nuclear tests over Kazakhstan in 1961 were only 1.2 kilotons (at 150 and 300 km altitude) but the existing infrastructure of Kazakhstan largely remained unaffected. This was not surprising as the relatively hardier electronics of that era was much less susceptible to E1 as well as to smaller E3 pulse due to the smaller yield of weapons. However, the 'Test 184' (290 km, 300 kilotons) apparently caused serious problems with the civilian infrastructure in Kazakhstan. The detonation altitude of 290 km results in the horizon radius is about 1,900 km, capable of affecting all of Kazakhstan. The overhead power and telecommunication transmission lines as well as diesel generators were extensively damaged. According to Jerry Emauelson:

Other known effects of 'Test 184' were that it knocked out a major 1000-kilometre (600-mile) underground power line running from Astana... to the city of Almaty. Several fires were reported. In the

6. United States Energy Research and Development Administration, *US High Altitude Test Experiences* (New Mexico: Los Alamos Scientific Laboratory, 1976), p. 31.

7. *Ibid.*

city of Karagandy, the EMP started a fire in the city's electrical power plant, which was connected to the long underground power line. The shielded electrical cable was buried 3 feet (90 cm.) underground. The geomagnetic-storm-like E3 component of the EMP... can easily penetrate into the ground. The E3 component of the Test 184 detonation... began rising immediately after the detonation, but did not reach its peak until 20 seconds after the detonation. The E3 pulse then decayed over the next minute or so.⁸

NON-NUCLEAR EMP

With existing technology, it is possible to build non-nuclear devices which can disrupt electronic systems, albeit only over a limited area. Non-nuclear EMP weapons, like radio-frequency weapons, are capable of causing damage or destruction to electronics devices locally. While existing non-nuclear EMP devices may require more refinement and consolidation before being inducted in military arsenals, the potential of production and possession of such viable and workable devices by non-state actors is a cause for concern. Even if the damage caused by such devices is localised, the ensuing disruption will be widespread if followed by other forms of attack. This potential, as a Hollywood *avatar*, was used in the movie "Ocean's 11", when the protagonists use electromagnetic pulse to shut down the power for about 30 seconds, employing a physics device called "the pinch," to enable them to rob a vault containing the riches of three casinos. In the movie, the machine, set off in Las Vegas, detonated an intense EMP that knocked out the city's power grid for some time. Though the ploy added to the entertainment quotient of the movie, it had little to do with real science. The most powerful generator, which has been physically realised, is a 100-foot by 20-foot tall cylinder-shaped machine, at Sandia National Laboratories in New Mexico. Sandia's "Z-pinch" is supposedly the world's most powerful electrical generator.⁹ Even this colossal Z-pinch is not capable of generating a very strong electromagnetic pulse.

8. Jerry Emanuelson, "Soviet Test 184", *Future Science*, <http://www.futurescience.com/emp/test184.html>. Accessed on April 20, 2015.

9. Sandia National Laboratories, "About Z", http://www.sandia.gov/z-machine/about_z/index.html. Accessed on January 20, 2015.

EMP EFFECTS

The EMP effects on independent/ interdependent systems and critical infrastructures could cause sufficient damage to be quantified as catastrophic in severity. The primary avenues for catastrophic damage would be through electric power infrastructure which would then cascade into damage to energy, telecommunications, networks, and other infrastructures. These, in turn, can seriously impact all the facets of our life, including the financial system, medical services, trade and production of goods. The consequent mitigating processes will require collective efforts to recover all key national infrastructures due to their interdependent relationship. The longer outage will make the recovery more problematic and uncertain. The physical and social fabric of the nation is sustained by a complex and dynamic network of interrelated and interdependent infrastructures, whose cohesive and harmonious functioning is imperative for a myriad actions, including transactions and flow of information to ensure orderly conduct of society. The vulnerability of these infrastructures to threats emanating from an EMP attack is one of the major strategic concerns of the governments.

- *Electric Power*

Every facet of a functional society is critically dependent on the availability of electricity. Continuous reliable electric supply within the specified limits of voltage and current is a critical element to its sustenance. All other infrastructures rely on electrical power and conversely, electric power is dependent on other infrastructures that are themselves vulnerable to the direct effect of EMP. Sufficiently robust EMP has the potential to cause a complete collapse of electrical power. A relatively modest to small yield weapon can produce a potentially devastating E1 field strength, spread over a large geographical area. This, followed by E2 and E3 impacts, will cause extensive damage to electrical components left relatively unprotected by E1.

- *Telecommunications*

Telecommunications provides the **amalgam which binds** the elements of our society together. A robust and reliable

telecommunication set-up plays an integral and indispensable role in the way governments function, businesses operate and society communicates. It is a critical enabler for the comprehensive and credible defence of a nation. Telecommunications provides a vital pathway between assessment of an emerging threat and a quick response. The major elements of the military and civilian telecommunication networks are made up of electronic systems with circuit boards, integrated circuits, and cable connections that enable generation, transportation and reception of information between users of the network. Such equipment has an inherent vulnerability to EMP threats. An EMP attack would cause debilitating disruption or significant damage to vital electronic circuits in the telecommunications systems in the geographic precincts exposed to EMP.

- ***Banking and Finance***

The financial services industry comprises an intricate network of organisations and associated systems that control the flow of monetary services in the form of fund transfers, loans, payments, deposits, savings, loans, and other financial transactions. The financial infrastructure literally rides on the electronic systems and is quintessentially dependent for its functioning, sustenance and reach. Virtually all records of financial transactions are stored electronically. All the banks and other financial institutions transact with each other and with their customers electronically. The electronic technologies that keep the financial juggernaut in motion are potentially vulnerable to EMP. Indirectly, these systems are dependent on other critical infrastructures, such as the power grid and telecommunications which, in turn, are potentially vulnerable to EMP.

- ***Aviation Infrastructure***

One of the key elements of the defence of a nation is its capability to protect its skies. This is achieved by aircraft, and a network of radars and communication. Besides, air travel has been ingrained in our way of life. Although most of the military and commercial aircraft have proven EM protection against a naturally occurring

EM environment, the safety of these, following EMP exposures, cannot be conclusively assured. Besides, the ability of military aircraft to function to the best of their capabilities in a hostile environment can be compromised following EMP exposure. The air traffic control regions, airport towers and airborne aircraft communicate through a multitude of telephonic, wireless and microwave devices. If communications are lost, the aircraft crews would find it extremely difficult to carry out a safe landing without jeopardising the airborne travellers.

- *Space Systems*

Over the past few years, there has been increased focus on space systems in low earth orbits and their unique vulnerabilities, among which is their susceptibility to nuclear detonations at high altitudes—the same events that produce EMP. Satellite services are important for national security and emergency preparedness because of their ubiquity and separation from other communications infrastructures. Satellites in low earth orbit generally are at risk of lifetime degradation or failure from collateral radiation effects arising from an EMP attack on ground targets.¹⁰ In the course of an EMP attack, a nuclear detonation at a high altitude produces numerous other effects, downgrading performance and jeopardising the survival of satellites. Consequent to an EMP attack, satellites can suffer collateral damage, on the one hand, and, on the other, ground terminals that satellite systems require for uplinks, downlinks and control functions, can get degraded.

EFFECTS ON THE MASSES

The data collected from observance of the effects of nuclear EMP from tests conducted during live trials and simulations could not collate direct adverse effects on people as a result of the EMP produced by a high altitude nuclear detonation. Medical surveillance studies on human exposure to pulsed electromagnetic fields have supported

10. Dr. John S. Foster, Jr et al., *Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack* (Washington DC: National Security Research Inc., 2004).

this inference. An important exception is people whose well-being depends on electronic life support equipment. They will be directly impacted by effects that disrupt or damage such devices. Some heart pacemakers may be among the devices susceptible to disruption from high-altitude EMP. While most effects on people would be indirect, they could be significant due to overdependence on systems facilitated or enabled by the electrical and electronic equipment. The human consequences of such a scenario include the social and psychological reactions to a sudden loss of stability in the modern infrastructure over a large area of the country. Loss of connectivity between the government and its populace would only exacerbate the consequences of such a scenario.

MITIGATION OF ADVERSE CONSEQUENCES

Protection of key system components, decentralisation of the network to strengthen peripheral services, facilitating non-synchronous interconnections, back-up power support, comprehensive recovery plans for the most critical infrastructure and a pool of adequately trained personnel, can adequately cushion the catastrophic impact due to an EMP attack. Some of the following suggestions will help in mitigating some of the adverse consequences of an EMP attack:

- **Understanding the System, its Interdependence with Other Systems, Including Cascading Effects:** For better understanding of EMP-related system response and recovery issues, in-depth research on system vulnerabilities would provide extremely valuable and insightful inputs. Once identified, modifications and additions capable of mitigating the effects of EMP attacks will provide functional, consequential, cost-effective and viable approaches and activities.
- **Developing National and Regional Restoration Plans:** The formulation of restoration plans to identify potential mitigation measures and accordance of priority to rapid restoration of power and other infrastructures would lead to reduction in outage duration post EMP attack. The plans must also account for ways to dovetail the requirements for providing and sustaining emergency services. Planning must include, not only the aspect of restoration of normal operating condition, but should also

be capable of facilitating functioning to a reduced capability of necessary services.

- **Adequate Availability of Spares for Replacements:** The expeditious availability of required spare parts to repair or replace damaged electronic and power system components and restoration, commensurate with a post-EMP attack and its impacts on related infrastructures such as communication will help in mitigating the effects to greater extent.
- **Availability of Critical Communications Channels:** The availability of back-up EMP survivable communication systems for command and control of operations and restoration of the critical infrastructure will ensure a speedy recovery. The most critical communications channels are the ones that enable recovery, not normal operations.
- **Expanding and Extending Emergency Power Supplies:** Presently, stand-alone back-up and emergency power supplies such as diesel and long-life batteries are usable only for relatively short periods due to limitation of at-site stored fuel and battery capacity. The length of time recommended for each location and load could be determined on a case-to-case basis such as for hospitals, financial institutions and telecommunication stations.
- **Prioritising and Protecting Critical Nodes:** The nodes critically required to either remain in service or to be restored as a priority following an EMP attack need to be identified, prioritised and protected against an outage due to loss of power. These must include what is necessary to avoid the collapse of rapid recovery of financial systems, key telecommunication systems and the government's command and control.
- **Availability of Sufficient Numbers of Adequately Trained Recovery Personnel:** Expanding the levels of manpower and training will enhance the recovery capability.
- **Veracity and Workability of the Recovery Plans:** Developing procedures for addressing the impact of such attacks to identify weaknesses, availability of trained personnel and developing EMP response training procedures will reduce or even diminish the effects created by an EMP attack.

Consequent to an EMP event, the ensuing effects need to be addressed specifically. Generic contingency plans for addressing blackouts and temporary loss of electronic infrastructure, protection of vital military and civilian infrastructures, and restoration plans after an EMP attack must be put in place and extensively practised. Last, but not the least, avoidance of mass panic among the population consequent to direct and incidental losses of infrastructures and networks needs to be chalked out and practised. It is time that the political and military leadership began to approach this matter with the seriousness it deserves and chalks out viable and workable plans to address the issues at multifarious level.

CHALLENGES OF TERRORISM IN CYBER SPACE

DILIPRAJ E

The presence of terrorists in the cyber world is not a new phenomenon as they had existed and used the resources of the internet for their operations since day one. However, their reliance on the internet is increasing day by day for various operational requirements. This is evident from the recent media reports which state that the Islamic State in Syria (ISIS), has succeeded in recruiting more than 20,000 foreign fighters to fight for its cause. It would have not been possible for the ISIS to reach out to such numbers and even more, people across the globe, had it not been for the internet. The traditional thinking was that terrorists would cause chaos in the virtual world by attacking computer networks, including the internet. However, it was not realised for a long time that more than a rational attack, the terrorists would use the information and resources readily available on the internet and get assistance from other technological developments of the cyber world to aid and conduct their evil missions. In other words, terrorists use and abuse the internet for their own benefit, more than attacking it physically or virtually. Hence, this paper would study the *modus operandi* followed by the terrorists in cyber space for their operational needs.

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Way back, in 1998, it had been recorded that about half of the 30 organisations designated as “Foreign Terrorist Organisations” under the US Anti-Terrorism and Effective Death Penalty Act of 1996 maintained websites; by 2000, virtually all terrorists groups were found to have established their presence in the internet.¹ These numbers kept increasing over the years and spread from mere website presence to other forms of communications like mailing, chatting, social networking, etc.

Since its inception, the internet has grown in a big way, in terms of the number of users, information storage, processing and sharing methods, various techniques of communication and as a medium of education, entertainment, etc. While all these factors add to the advantages of the internet, the following are also equally important vulnerabilities in the disguise of advantages, inherent in the operations of the internet, that are manipulated by evil minds for their selfish gains and terrorising acts:

- Easy access.
- Little or no regulation, censorship, or other forms of government control.
- Potentially huge audiences spread throughout the world.
- Anonymity of communication that reduces the risk of being caught.
- Fast flow of information.
- Inexpensive development and maintenance of a web presence.
- Interactive platform.
- A multi-media environment.
- The ability to shape coverage in the traditional mass media, which increasingly use the internet as a source for their stories.²

MODUS OPERANDI OF TERRORISTS IN CYBER SPACE

Today, almost all the banned terrorist organisations of the world, irrespective of their size, operating location and capability, have a presence in the cyber world. Their presence is in the form of websites

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1. Gabriel Weimann, “www.terror.net - How Modern Terrorism Uses the Internet”; *Special Report*, United States Institute of Peace, March 2004.
 2. Gabriel Weimann, “Virtual Training Camps: Terrorist Use of the Internet”, in James J.F. Forest ed., *Teaching Terror: Strategic and Tactical Learning in the Terrorist World* (Rowman & Littlefield, 2006), pp. 110-132.

which are multi-lingual at times. They are also present in the social networking sites, chat rooms, forums and other public interactive platforms that help them reach the society with stealth. The use of the internet by terrorist organisations resembles the use of the medium by traditional political organisations – for instance, raising funds and disseminating propaganda. Other uses, however, are much more unusual and distinctive such as hiding instructions, manuals and directions in coded messages or encrypted files. Although the internet is exploited by the non-state actors in all possible ways, the following are the seven classifications under which all the uses of the internet by terrorists can be listed:

- Networking of the organisation.
- Publicity and propaganda.
- Psychological warfare.
- Fund raising.
- Data collection and information dissemination.
- Recruitment and mobilisation
- Planning and coordination.

Networking of the Organisation

Like all organisations, terrorist organisations also have their own hierarchy, command and control structure in order to maintain their cadres, pass orders, messages and information to carry out their missions and also to fulfill the needs and goals of the organisation. Due to the crackdown of government agencies on the terrorist organisations all around the world, it has become difficult for the terrorists to meet in a single place to discuss their goals, missions, plans and methods. Moreover, the geographical distance between different units of a terrorist organisation requires a common networking medium for them to be linked with one another. Therefore, they have opted for the easier means of communication technologies to keep their networking tight enough to run their organisation and also keep their command chain unbroken. The new communication technologies in the digital medium using computers have some special advantages that prove to be a boon for these terrorists.

- First, these communications made through computers reduce transmission time while most of them work in real time; therefore,

they enable the terrorists to contact their dispersed organisational actors swiftly, and coordinate effectively.

- Second, these new technologies are available at a cheaper price which helps the organisations reduce their financial burden.³
- Third, by employing proper encryption methods while communicating, like the use of software like 'Mujahideen Secrets 2', to hide their location in the digital medium, the sender and receiver never have to emerge from their hiding locations for communication.
- Fourth and the most important advantage is that by adapting to the modern cyber methods of communications, the terrorists have increased the variety and complexity of the information that can be shared.⁴

Also, the modern communication technology helps these organisations to enhance their links with other organisations for sharing information and resources with those who have similar ideologies, goals and ambitions.

Publicity and Propaganda

The traditional media like television, radio and print media which are the means of publicity and propaganda are all heavily monitored and protected by the laws of governments and their agencies. Therefore, the ungoverned internet became a boon for the terrorists to communicate to their targeted audiences easily, bypassing all the laws and the vigilant eyes of the law enforcing agencies. The terrorists and terrorist organisations use their websites and other platforms of the internet to post messages, videos, make statements and other forms of multi-media communications to justify their violent actions, blame their enemies, gain sympathy, garner support and popularise their ideas and movement among the public. The fact that the terrorists now have direct control over the content of their message offers them an opportunity to shape how they are to be perceived by different target audiences, to manipulate their own image as well as that of their enemy.

3. Ibid.

4. Ibid.

Websites are the main source of publicity and propaganda as they contain all the information about the organisation—its history, leaders, ideology, agenda, publications, the speeches of its leaders, popular statements made by its leaders, and photo and video galleries. While English is the preferred language, many organisations also have multi-lingual websites to cover a larger audience. There are also cases where the websites are not officially owned by the terrorist organisations but by their sympathisers, supporters or followers which creates confusion for the government agencies to identify the real plans of the terrorists. The blogs owned by the terrorists are being used as mini websites, to the utmost level possible, with almost the same functions as a website.

Chat rooms and forums provide free hangouts for the terrorists to influence the minds of the younger generation around the world, who ignorantly fall into the terrorists' trap. Many groups in these chat rooms and forums are dedicated to various terrorist outfits and each group has a sizeable number of followers. The followers of these groups in the chat rooms and forums fall in the category of sympathisers and supports who can turn into active followers at any point of time.

Video hosting sites like YouTube play a major role in providing propaganda for the terrorists as it gives them the visual means of communication with the whole world. These video hosting sites are used to post videos, ranging from the most gruesome ones to videos of the speeches of terrorist leaders. For instance, the beheading of a number of ISIS victims in 2014 and 2015 was broadcast via videos posted on various video sharing websites, which were then picked up, and broadcast and reported via the mainstream media. They also post videos that describe the plight of their women who were sexually abused, in order to gain sympathy for themselves and to justify their violent actions.⁵ There are unaccounted numbers of videos posted every day in these video hosting sites all around the world and anyone who has a basic understanding of computers and the internet can get access to these videos, but it is very difficult for

5. http://www.youtube.com/watch?v=omnKITLL0jA&feature=player_embedded#t=0. Accessed on February 28, 2014. This is a video in which a woman who claims to be a victim of rape by the U.S. forces in Iraq narrates the incident to Al-Jazeera news media.

the governments or the law enforcing agencies to track down every video and remove it from the site.

The social networking websites, the latest entrant in the cyber world, are inclusive in nature and encompass all the attributes of internet communications like messaging, photos and video sharing, message posting and file sharing. Every feed in these social networks is considered important when it is related to any sensitive issue happening around the world. Therefore, these social networking websites are a boon for the terrorists to contact, share and use as a publicity and propaganda platform. Moreover, absence of restrictions in these social networking websites helps the supporters and sympathisers of any terrorist organisation to be in contact with one another and to share their ideologies openly in a public forum. The recent arrest of Mehdi Masroor Biswas, the alleged operator of a pro-ISIS Twitter account named 'Shami Witness' which had more than 17,000 followers and two million views, reveals the extent of use of such social networking platforms by the terrorists.

Psychological Warfare

The basic idea for the terrorists to wage psychological warfare is to exaggerate their abilities, shield their capabilities and also to implant fear and create panic among the public about the violence and other brutal consequences that could be the result of any possible terrorist attack. In simple terms, psychological warfare in the cyber world is used by the terrorists to create 'cyber fear' among the public.

The internet, with its highly advanced communication technologies and multi-media environment, provides a favourable situation for the terrorists to amplify the potentials of an attack. The video hosting websites are explicitly used as the main platform for the psychological warfare by the terrorists by posting videos of recorded terrorist activities along with messages that would explain a terror plot to frighten the society. A terrifying example would be the case of the *Wall Street Journal* reporter Daniel Pearl—a video showing him being beheaded by Al Qaeda in Pakistan in 2002. By releasing this propaganda video, the actual aim of Al Qaeda was to frighten the American government and other Americans living in the Muslim world as the video ends with the scrolling of the following lines of warning:

*We assure Americans that they shall never be safe on the Muslim land of Pakistan. And if our demands are not met, this scene shall be repeated again and again...*⁶

The *jihadis* produce videos in a professional manner possibly by hiring amateur and aspiring film-makers and these videos are released through media outlets such as the Al-Sahab Institute for Media Production (video production arm of Al Qaeda) and appear frequently on the public media as well as the web.⁷ These videos and messages have the dual impact of spreading anxiety among the public while simultaneously boosting the morale of the *jihadi* supporters, sympathisers and like-minded groups.

Apart from the video broadcasting method of psychological warfare, the terrorists also use the internet for their long-term achievements to threaten the people of a country by spreading disinformation, delivering threats, and dissemination of horrific images over the internet. An appropriate example would be the case of serious internal security disturbance caused in India in August 2012 due to the covert psychological warfare by unidentified miscreants from Pakistan. The Indian government was alerted when thousands of northeastern people gathered at railway stations in various cities all over the country, to flee to their homes after being threatened by a series of SMS and violent morphed pictures that were being circulated on more than 100 websites. The SMS threatened the northeast people living in various cities in India of a targeted attack on them and asking them to go back to their homes, while the pictures circulated on the internet showed violent bloodshed images. The Government of India reacted quickly on this matter and the investigations by the Indian intelligence agencies revealed that the morphed images originated from cities like Lahore, Rawalpindi and other Pakistani cities. This act by Pakistan based elements was seen as cyber terrorism and cyber psychological warfare against India in order to cause internal security disturbance and, eventually, to create a huge crisis in the country.

6. "Daniel Pearl Execution", http://www.liveleak.com/view?i=01e_1175818014. Accessed on February 12, 2015.

7. "Al Qaeda Videos and 3rd 9-11 Anniversary", v.1.0. (Alexandria, VA: Intel Centre, 2004).

Fund-Raising

Organisations around the world function with numerous purposes and ideologies but the general rule is that irrespective of their ideologies, purposes and demands, they all need funds to survive and operate to achieve their goals. Terrorist organisations are no exception to this rule as “they need substantial funds for planning terrorist attacks, training and recruiting operatives, disseminating propaganda, providing transportation, preserving channels of communications, supporting satellite organisations and subsidising living costs of terrorist operatives.”⁸ It is for this reason that terrorist organisations around the world use all possible overt and covert means of fund-raising. One of these covert means is the use of cyber technology for raising, transactions and circulation of funds to meet their organisation’s financial demands. The financial support is obtained by: requesting charities online; indulging in credit/debit card frauds; laundering money through online gambling; using peer-to-peer transaction services; misusing and stealing digital currencies and mobile financing.

For instance, after the crackdown by the global forces on the overt methods of fund raising which depended largely on donations by Al Qaeda, the terrorists shifted to more covert methods or, in other words, virtual methods by which the “global fund raising network was built upon a foundation of charities, non-governmental organizations and other financial institutions that use websites and internet based chat rooms and forums.”⁹ Analysts found Al Qaeda and a few humanitarian relief agencies using the same bank account numbers on numerous occasions.¹⁰ In general, most of the websites and blogs owned by the terrorist organisations or their supporters have a column for accepting donations to their organisation and their cause.

The terrorist organisations also use the illegal method of money laundering in its digital version to fulfil financial needs, which is known as online money laundering/ cyber laundering. Money laundering over the internet is carried out through fake online

8. Sean Paul Ashley, “The Future of Terrorist Financing: Fighting Terrorist Financing in the Digital Age”, *Penn State Journal of International Affairs*, 2012, pp. 9-26.

9. Weimann, n. 1.

10 Timothy Thomas, “Al-Qaeda and the Internet”, *Parameters*, USAWC, Spring 2003, pp. 112-123.

auctions, online sales, online gambling websites, peer-to-peer transactions, as well as through online games like 'Second Life'. The prepaid storage/ payment cards, different forms of e-money, like ekash, PayPal accounts or payments over mobile phones are also used for easy cyber laundering.

The laundering of funds over the internet and through mobile phones is made particularly easy by the growing use of peer-to-peer transactions, i.e. funds directly transferred from one individual to another, without the interaction of a third party, such as a financial institution, thus, avoiding financial oversight, accountability and potential detection. The rapid growth of mobile payments, especially in the developing countries, like Kenya where M-PESA is booming, makes it particularly easy for terrorists, as payments are handled only by mobile phone companies, thereby avoiding the prying eyes of financial oversight and law enforcement agencies.

However, after the introduction of digital currencies like "bitcoins" into the cyber world, the way online transactions take place in the contemporary cyber world has seen a slight change. Although these digital currencies are created and transferred using cryptographic methods, they are vulnerable to digital thefts from hackers and are being used by online money launderers for their cyber laundering. Additionally, credit/debit card frauds, online sale of drugs and other merchandise in the deep web are other means of fund-raising for terrorist outfits to feed their organisations' financial needs.

Data Collection and Information Dissemination

Where data and information are concerned, the terrorists use the internet mainly for two reasons: one, for collection of data as so much information is available electronically 'for free' on the web, and two, for dissemination of the information as the web gives a high level of anonymity. The former is evident from the "Al Qaeda Training Manual", which was confiscated from the apartment of a suspected Al Qaeda member in Manchester, England, in May 2000, which stated, "Using this [internet] public source openly and without resorting to illegal means, it is possible to gather at least 80 percent of information about the enemy".¹¹

11. "Al-Qaeda Training Manual", provided courtesy the Behavioural Analysis Programme, Operational Training Unit, Counterintelligence Division, FBI Headquarters.

This is one of the major reasons behind the increase in the number of incidents of hacking and data theft all around the world. In addition, the terrorists surf the internet to find information about possible targets for attacks, which include railway stations, airports, markets, malls, and more sensitive areas like dams, nuclear facilities, government buildings, etc. They look for blueprints of installations, detailed maps of particular locations, existing security information for the infrastructure, etc. They use the expertise of hackers who, in turn, hack into the servers of various organisations to acquire the desired information by exploiting the vulnerabilities in the organisation's network facility. The terrorists also use open source mega data providers like 'Google Earth' for their collection of coordinates, maps and other data about a particular location. The open source availability of digital designs of small arms like rifles, pistols, etc is exploited by the terrorists to manufacture these on their own, using advanced methods like 3D printing.

The terrorists also use the various facilities available in the cyber world to disseminate their knowledge to a wider audience. The web acts as a free publishing house for the terrorists to publish their research articles on various issues ranging from international politics to technical issues. For example, the bi-monthly online magazine called "Technical Mujahidin" distributed by the 'Al-Fajr Information Centre', deals with topics like information security, ways of protecting computers, editing, sound engineering, news of the *jihadist* media, and monitoring the crusader leaders' comments about the impact that the *jihadist* media have on them, etc. Another magazine, "Inspire", is an English language online magazine published in the Arabian Peninsula by Al Qaeda and is considered to be a political warfare tool targeting the American and other Western governments, with the intent of inspiring home-grown terrorism. This magazine is particularly popular for one of its columns titled "How to make a bomb in the kitchen of your mom".

The terrorists also use cyber space for their process of information dissemination to their target audience through the following methods:

USB Drives: The USB drives provide an easy source to carry/transfer large amounts of data. This is evident from the fact that "Osama Bin Laden stored his messages in a thumb drive and sent it

through his human courier, who, in turn, would travel a long distance and send the messages saved in the thumb drive via e-mails from a public cyber booth to fellow *ihadists* around the globe.”¹²

E-Mails and SMS: Even though e-mails and SMS, can be traced and intercepted, the terrorists use the method of coded language and metaphors to hide the actual content of the message from the preying eyes of intelligence agencies. “During the preparation for the 9/11 attacks, the operator Mohamed Atta and conspirator Ramzi bin al-Shibh exchanged e-mails pretending to be students, in which they used metaphors like ‘architecture’ for the World Trade Center, ‘arts’ for the Pentagon, ‘law’ for the Capitol and ‘politics’ for the White House.”¹³ By using these metaphors, they avoided the radars of the intelligence agencies and, at the same time, succeeded in communicating to their commander through the digital medium. Similar tactics can be followed in SMS too. Moreover, another tactic that terrorists follow in using e-mails as the communicating medium is creation of multiple login ids and passwords and using each combination only once.

E-Dead Drops: The terrorist who wants to convey a message creates the message and just leaves it in the drafts instead of clicking the send button and the intended receiver of that message logs in with the same id and password which was shared earlier and reads the message from the drafts column and deletes it, thereby leaving no cyber-footprint.

SIM Cards: The use of external SIM cards is a big boon for the terrorists as they are cheap, easily available and can be purchased by submitting some fake identities and can also be disposed of when the work is over. The terrorists also use stolen SIM cards for their purpose and then dispose of them to escape being tracked.

Social-Networks, Public Chat Rooms, Forums and Gaming: Many chat rooms are in-built with encryption software to provide privacy for customers and this facility helps the terrorists to share

12. Mark Benjamin, “Bin Laden’s Secret Communications Plan: Use a Thumb Drive”, *Time*, May 12, 2011, <http://nation.time.com/2011/05/12/bin-ladens-secret-communications-plan-use-a-thumb-drive/#ixzz2vG9Ypmx>. Accessed on February 26, 2014.

13. “The Terrorist’s Tricks and Counter-Measures”, *Frontline*, January 25, 2005, <http://www.pbs.org/wgbh/pages/frontline/shows/front/special/techsidebar.html>. Accessed on February 26, 2014..

their information in a safe zone. Also, there are numerous pages in the various social-networking sites that are operated by the terrorists and their supporters to spread their information among the global audience and also to their targeted audience. Interestingly, even the online gaming sites are not spared by the terrorists. While they launder funds through some games, they also chat under the cover of playing game, as all these online gaming services provide chatting options for their players.

Peer-to-Peer Communication: The use of peer-to-peer digital communication channels like satellite phones, Voice Over Internet Protocol (VOIP) and Video Voice Over Internet Protocol (VVOIP) have become common among terrorists. The investigations of the 26/11 Mumbai attack took the investigating agencies to Italy and to their surprise "it was found that on November 25, on the eve of the attack, a request with the number 88647575 was made from a person called *Kharak Singh*, in India to the telephone company, Callphonex a US based company, in order to activate 5 Austrian DID lines of the VOIP account in the name of Mohammed Ashfaq from Pakistan. On the same day, payment for the VOIP account was made in Italy using Western Union money transfer by a person of Pakistani origin who claimed to be *Kharak Singh*. During the attacks, the terrorists used the US based number 201-253-1824 to communicate amongst themselves and the attack commander received real time instructions and information from their handlers using the same number."¹⁴ It was even found that the handlers and attackers had made 150 test calls before the attacks between November 24 and 26 to test voice clarity, sound audibility, etc.

Recruitment and Mobilisation

For any organisation, new recruits are like fresh blood flowing in its arteries and for a terrorist organisation, the younger the recruits are, the easier it is for its leaders to mould them for the cause. Therefore, the terrorists target the young people who use the internet and try to manipulate their emotions. The terrorists follow a pattern for

14. Vaiju Naravane, "Italian Police Explain how VOIP was Used on 26/11", *The Hindu*, November 23, 2009, at <http://www.thehindu.com/news/national/italian-police-explain-how-voip-was-used-on-2611/article53189.ece>. Accessed on February 27, 2014.

their recruitment process through the internet using the following methods:

- They employ various tactics like spreading online propaganda through their websites, blogs, forums, chat rooms and social media accounts.
- Sending out repeated clear and simple messages to their targeted audience.
- Using video streaming to convey their leaders' messages, interviews, or to show doctrine photos and video footage of sorrowful sights of a particular community to gather sympathy towards them.
- By using cartoons, games and other multi-media facilities to indoctrinate the minds of children.
- By identifying the prospective recruits and disseminating destructive information through publications, video chatting, etc.

However, it should be noted that modern terrorists do not recruit directly online, rather they use the net only to identify, profile and select potential candidates for recruitment due to the fear of infiltration by the security agencies and counter-terrorism forces.¹⁵ After identifying, and indoctrinating recruits online, as the next step, the recruits are mobilised using the internet, giving them a rendezvous point from where they are sent to the training camps.

Planning and Coordination

The internet plays an important role in the planning and coordination of the terrorists' missions. One classic example of this would be the use of cyber technology in the planning and coordination of the 26/11 Mumbai terror attacks by the Lashkar-e-Tayyeba (LeT) terrorist organisation. During the planning phase, Google Earth imagery was extensively used by the LeT terrorists to conduct virtual reconnaissance of their targets. The reconnaissance was precise to the extent of locating the entrances and exits of the primary target locations. Also, with the help of Google, the attackers marked the geographic

15. Gabriel Weimann, "Using the Internet for Terrorist Recruitment and Mobilisation", in Boaz Ganor, ed., *Hypermedia Seduction for Terrorist Recruiting* (IOS Press, September 2006), pp. 47-58.

coordinates of their target and used these to programme their Global Positioning System (GPS) devices.¹⁶ By the use of these coordinates, the attackers infiltrated the location via the sea, undetected, under the cover of darkness. The whole attack was coordinated by the handlers in real time with the help of VOIP enabled phones and satellite phones. The handlers of the attack kept monitoring live updates from the social networking sites like Facebook and Twitter to know the situation in Mumbai and also analysed the movements of the security forces in different locations with the help of the live relay on TV news channels. In fact, when they realised that the handlers were using the updates from social networking sites and TV news media, the Indian security forces made a public appeal in social media sites to stop updating anything related to the attack. The media was also instructed not to relay live video footage of the attack.

CONCLUSION

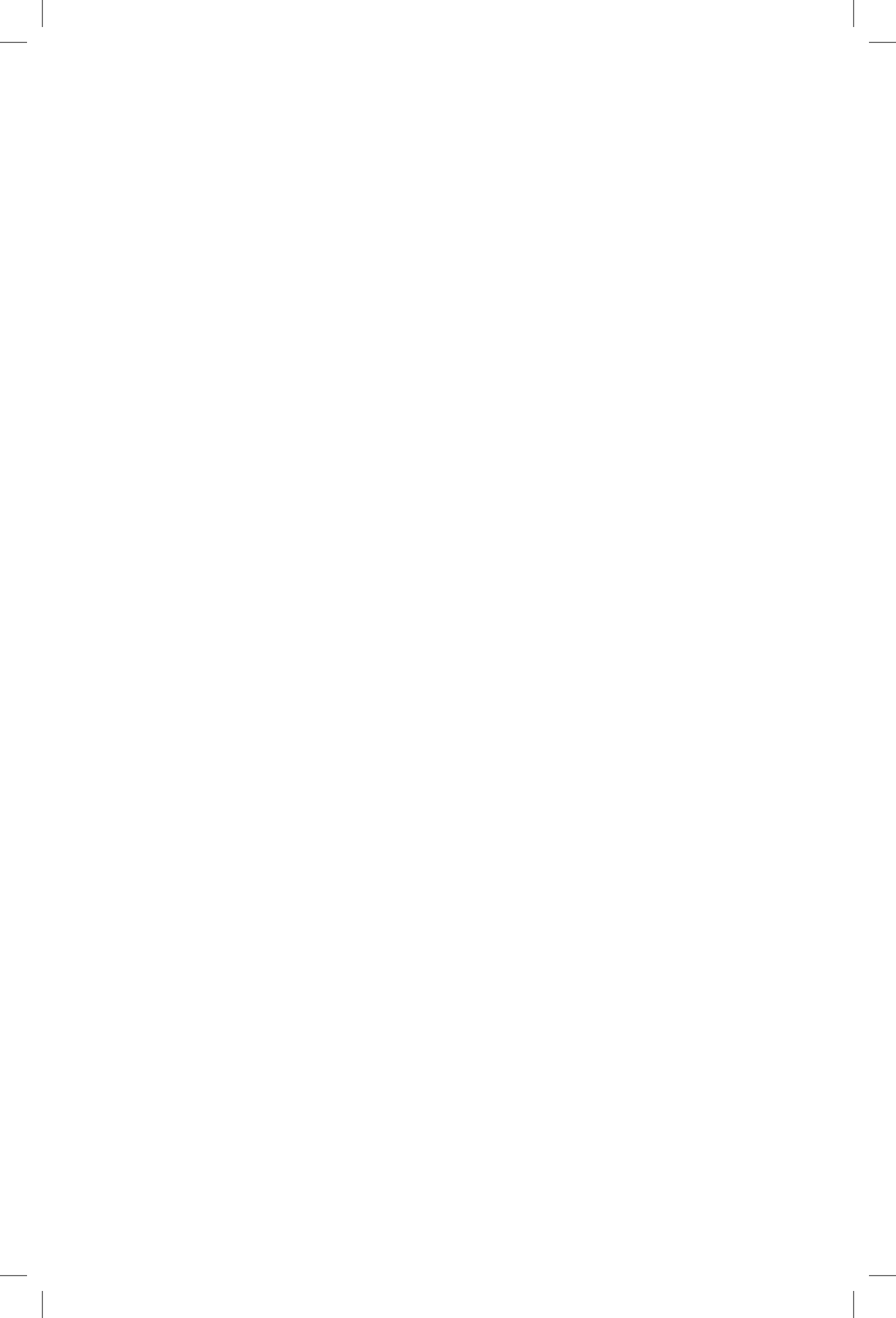
As terrorist organisations are becoming more decentralised and more global, combined with the advent of new technologies in the cyber space, the use of the internet by terrorists is only going to increase in the coming years. Therefore, in order to eradicate terrorism from the world, it is not enough to only have stringent efforts in the real world—it is essential to understand the activities of the terrorists in the complex cyber space by identifying, analysing and illustrating the ways in which the various terrorists and terrorist organisations exploit the unique attributes of the internet and manipulate the technological advancements in cyber space for their evil tasks.

The government agencies around the world are trying their best to track, trace and eliminate the terrorist activities in the internet with their data mining projects like the PRISM project and X-Keyscore of the US. But, such programmes also have their own disadvantages as they violate the personal freedom of individuals in the virtual world. However, until they are able to lead the investigative agencies towards the terrorists, such programmes are likely to remain operational. As one of the important countries which have felt the heat of terrorism for a long time, India is also making efforts to reduce the presence of

16. John Bumgarner, "Tech-Savvy Terrorists", *Asia Pacific Defence Forum*, November 4, 2011.

terrorists in the virtual domain. The agencies responsible for cyber security in the country are constantly focussing their efforts to check the evil deeds of the terrorists in the cyber world. More recently, the tracking and arrest of Mehdi Masroor Biswas, the pro-ISIS Twitter account handler, in 2014, and the tracking of various other individuals who were indoctrinated by ISIS ideology is proof of India's efforts to fight terrorism in the cyber world. Nevertheless, the country faces an acute shortage of experts, which is visible from the country's National Cyber Security Policy document. It is claimed in the document that India needs around 500,000 cyber security experts by 2018; however, the existing number of experts is comparatively meagre. Although, the government claims to have created a National Security Database, which consists of a verified list of credible and trustworthy 'ethical' hackers who would respond during times of distress, the country does not have a mechanism to identify new talent from the country in this field. Moreover, having a host of hackers alone would not solve the shortage of cyber security experts in the country. India should address its challenge of lack of human resource in the cyber security field in order to enhance the overall cyber security of the country.

Also, at the global level, close cooperation and collaboration between the cyber security agencies is necessary in order to contain the menace of terrorists in the cyber world as this realm provides them borderless access and operational capability. Undoubtedly, cyber space will be a highly contested battleground of the future where states will not only have to compete with each other but also have to face a more violent and unconventional challenge from the terrorists.



DISASTER RELIEF OPERATION: KAIZEN TO DRAW MORE FROM AIRLIFTS

ASHOK K CHORDIA

For India to be better prepared to meet disasters, it needs to levitate into becoming another kind of country.

— Santosh Desai¹

AIRLIFT FOR DISASTER RELIEF: GAUGING THE EFFECTIVENESS

Lately, disasters have been visiting the Indian subcontinent with the regularity of the solstices and the equinoxes. And in all cases, without exceptions, airlift has been playing a predominant role in mitigating the misery of the distressed people. The is so, because on such occasions, *time* is of the essence, and delivery of supplies by air is the quickest means of reaching the needy. Air power is put to test under such circumstances. A very large number of people owe their lives to the timely relief made possible due to the judicious exploitation of the airlift capability of the country in general, and the Indian Air Force (IAF) in particular. These relief operations are undertaken in hazardous conditions, often at the risk of the lives of

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1. Santosh Desai, "A Catastrophe Called Disaster", *The Times of India*, June 24, 2013, p. 6.

the pilots who fly the aircraft. The loss of an Mi-17 V5 during the Uttarakhand disaster (June 2013) and a Chinook helicopter during the Nepal earthquake (May 2015) bear testimony to the inherent risks. Each relief operation comprises a saga of the people working selflessly beyond the call of duty.

Do all the dividends of the airlifts, undertaken so painstakingly, reach the sufferers at the other end? It is difficult to gauge the effectiveness of such airlifts. The tonnage hauled and the number of passengers evacuated in the least possible time is the accepted yardstick against which the effectiveness is generally evaluated. Over the years and through scores of disasters, the procedures to provide relief have been refined to a great extent. Experience has helped to improve the output: more tonnage and more evacuations in less time. Owing to refinement in the procedures and conscientious training, the IAF aircraft loaded with relief supplies reached Kathmandu within about six hours of the first shocks experienced by Nepal.² In fact, the preparations to carry the supplies had begun instantaneously. While the decisions were being taken and modalities for conduct of relief operations in a foreign country were being worked out at the helm, the aircraft were being loaded. As per some accounts, the first IAF aircraft carrying relief supplies were airborne within 45 minutes of the “*go ahead*” instructions.

The beneficiaries of airlift who escape death and devastation feel grateful; the survivors bless the *angels* who virtually descend from the heavens and save lives. Since the dead do not tell tales, the inadequacies of the relief operations, if any, go unobserved. The number of casualties or deaths—due to the benefits of airlift not reaching the needy—remains unaudited; the true potential of airlift gets obscured and hence, remains underutilised.

It is not possible to experiment with airlifts while a region is going through a disaster. But a close look after a disaster can reveal the untapped (or less tapped) power of airlifts. Thereafter, small and continuous improvement, wherever possible and by whoever possible—*Kaizen*, as the Japanese call it—can enable exploitation of the *balance* potential, which, in turn, can accrue dividends by way of fewer lives lost and less suffering for the survivors.

2. “Himalayan Tragedy”, *The Sunday Express*, April 26, 2015.

The cloudbursts, incessant rain, flash floods and landslides in Uttarakhand (June 2013) and the earthquake in Nepal (April 2015)—still fresh in the minds of people—are the epitome of disasters that frequent the Indian subcontinent year after year. They also reflect the way India responds to natural calamities. A revisit to these disasters, with a holistic approach, is likely to give a fair assessment of the effectiveness of airlift operations in bringing succour to the devastated regions. Though undertaken at a tranquil time—when India is not facing the fury of nature—such a revisit can still give worthwhile insights into the ways of getting superior returns for the invested efforts.

Two other major airlifts—the *Over the Hump Airlift (1942-45)*³ and the *Berlin Airlift (1948)*⁴—are relevant. Though they took place over 70 years ago, were spread over several years, and one of them, the Berlin Airlift, took place in Europe, there are some parallels. We face similar constraints, of both equipment and human resource. A glance at those airlifts can provide valuable insights. A more recent airlift during the Gulf War also has many lessons. But it was technology intensive, and, therefore, there are fewer parallels, so it is less relevant in our context.

THE EPITOME OF DISASTER RELIEF OPERATIONS IN INDIA

Uttarakhand (June 2013)

It was a case of the first monsoon rain of the year turning devastating. As always, the armed forces and the paramilitary forces rushed to the rescue of the people instantly. Within the first ten days, the Indian Air Force airlifted over 13,000 people and dropped over 2,00,000 kg of relief material in more than 1,500 airlift sorties, in an operation which was fondly and appropriately christened “Operation Rahat”.⁵ The airlift continued unabated despite the crash of an Mi-17 V5 helicopter, killing all 20 on board, including the crew. The Indian

3. This airlift was undertaken by the American and the British forces in the China-Burma-India (CBI) Sector (1942-45) to supply the Chinese forces across the Himalayas.
4. This historical airlift was undertaken by the Allies to supply the besieged city of Berlin in an effort to prevent it from falling into the hands of the Soviets.
5. These figures and others mentioned here have been compiled from various sources in the print and electronic media over a period of time.

Army (Operation Surya Hope) deployed its helicopters and saved over 2,700 pilgrims in over 600 sorties in the same period.⁶ Over 45 helicopters and fixed wing aircraft of the IAF flew relentlessly—supplying food, water, medicines, blankets, clothing and tents. The supplies were air-landed at suitable locations. Critical supplies were air-dropped where landing was not possible. The supplies were accurately dropped except, in stray cases, they landed in inaccessible terrain and could not be retrieved. A few helicopter sorties were also devoted to air-dropping firewood for the cremation of the dead. It was a laudable effort—the media dubbed it as the “IAF’s biggest ever helicopter based rescue operation in history”.⁷

Nepal (May 2015)

Two years later, the April 2015 earthquake in Nepal was equally devastating. It was the worst earthquake in the region in 80 years; it triggered landslides and flattened entire villages. The existing disaster response system in India enabled 10 teams of the National Disaster Response Force (NDRF), totalling nearly 450 personnel, to be there⁸ in less than six hours after the first wave of devastation. In fact, as per some accounts, the first IAF aircraft with relief material and NDRF personnel on board were airborne within 45 minutes of the “go ahead” instructions. The relief effort was spectacular and unprecedented. By the end of May, the IAF alone had evacuated nearly 9,000 people, airlifted more than 1,250 tonnes of supplies in nearly 1,500 sorties. Here too, the airlift effort earned kudos from the survivors.

Several other countries jumped onto the bandwagon to be with Nepal in its hour of need. Chinese, French, British and US relief teams, among many others, conducted parallel relief operations. In a surprise move, the Nepalese government requested the British contingent to leave the country. Some say that the downwash of the Chinooks would have damaged the dilapidated houses and, hence, they were asked to quit. This doesn’t appear logical, as the American Chinooks continued operating. In fact, the US lost a Chinook helicopter with the Marines and the aircrew on board. Some others

6. “Of Winged Angels and Heroic Deeds”, *Hindustan Times*, June 27, 2013.

7. “Operation Rahat”, *The Times of India*, June 24, 2013.

8. n.2.

believe that Nepal did not want to displease the Chinese by allowing the British to fly so close to their border.⁹ Several days into the relief operations, the Nepalese government became somewhat indifferent to the Indian support too. It will be some time before the *real* reasons for Nepal refusing assistance become public. The relief work by the Indians continued unabated, regardless.

IT PAYS TO SEE A GLASS HALF EMPTY

The above operations are sagas of herculean efforts resulting in the saving of thousands of lives. As suggested earlier, there could, however, be a different way of looking at the effect of those airlifts—by analysing the number of casualties/ deaths rather than the lives saved or the tonnage hauled. A relook, *zoomed in* at a different point of the process, reveals that despite the untiring efforts and the massive airlifts, nearly 6,000 people died¹⁰ in Uttarakhand. In Nepal, the death toll was 8,699.¹¹ Even if some of the initial casualties are discounted as *inevitable*, the balance sheet still raises concerns. These two disasters are mere samples; they are the epitome of the efforts made repeatedly, year after year. A review of the data of some of the major disasters in the recent times will reveal that notwithstanding the promptness and sincerity with which relief operations are undertaken, the death toll—excluding the people who die due to the initial impact of the disaster—is often alarming. A dispassionately honest approach poses a logical question: “Can the number of casualties be lowered?”

Before one responds to that pointed question, it would be worthwhile to understand the focus of airlifts during disaster relief operations.

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9. Ben Farmer, defence correspondent, “RAF Chinook Helicopters Returning to UK After Nepal says They are Not Needed,” *Telegraph*, May 15, 2015, <http://www.telegraph.co.uk/news/worldnews/asia/Nepal/11609600/Rafters-returning-to-UK-after-Nepal-says-they-are-not-needed.html>. Accessed on June 2, 2015.
 10. Siddhartha Kumar, “5748 Feared Dead After India Floods,” July 15 2013 at 12:03pm, *IOL News*, <http://www.iol.co.za/news/world/5-748-feared-dead-after-india-floods-1.1546813#VW19ImCF8XN>. Accessed on June 2, 2015.
 11. “Nepal Earthquake 2015: Disaster Relief and Recovery Information Platform (NDRRIP)” Government of Nepal, Nepal Disaster Risk Reduction Portal Kathmandu, <http://drrportal.gov.np>. Accessed on June 2, 2015.

THE FOCUS

Be it a natural disaster like a flood, an earthquake, a tsunami, a cyclone, a cloudburst, a forest fire or a man-made disaster like the Bhopal gas tragedy (1984) or the Fukushima nuclear disaster (2011), the focus of relief and rescue operations remains practically the same, with minor differences to suit specific needs. Those can be generalised as:

- Positioning rescue teams with medical aid at the earliest.
- Supplying food, water and other absolute necessities to the affected people.
- Expeditious evacuation of people/casualties to the nearest haven.
- Checking/ mitigating the effect of the disaster while rescue and evacuation is going *on*.

Undoubtedly, aerial delivery is the best means of delivery that can achieve the expected response almost anywhere, any time.

KAIZEN: SMALL IMPROVEMENTS TO GET TANGIBLE RETURNS FROM AIRLIFTS

Airlift as a process has been under perpetual refinement because every disaster teaches better ways of doing things; it is a well-oiled, smooth, running system, and there is little that can be done to improve it. Nonetheless, there is scope for *Kaizen*—small continuous improvements in the way the output of the airlifts is exploited. A conscientious approach can make a tangible difference. Cumulative improvements can translate into more lives being saved. Briefly discussed here are some simple ways of getting the best out of airlifts to bolster the disaster relief effort.

AIRLIFT CAPACITY

Numbers matter—they always do. One cannot predict the intensity or the devastation of a future disaster. Therefore, a sound airlift capability and a formidable capacity to supply/evacuate is a given. The timely acquisition of the C-130J Super Hercules and C-17 Globemaster has boosted India's airlift capacity. The IAF's helilift capacity is equally sound. But even a very large fleet of aircraft may not be a guarantee against disasters or crises of all magnitudes. Crisis

situations sometimes demand augmentation of the IAF's capacity. This has happened in the past: aircraft of Air India have been chartered to evacuate Indian expatriates from foreign countries. But the existing system is loosely organised – there is no *commitment* on the part of the airlines; the crew are not bound to fly in hazardous conditions or through hostile air space. The Air India crew had threatened to ground their fleet (even as expatriates awaited airlift out of the war-torn region) when a set of their crew was stranded in Kuwait at the outbreak of the Gulf War (1990).¹²

The US too, despite its formidable airlift capacity, sometimes faces shortage of aircraft. However, the US has a system of enhancing the airlift capacity in times of crises: the US Civil Reserve Air Fleet (CRAF) augments the airlift requirements of the Department of Defence (DoD) in emergencies when the need exceeds the capability of the military fleet. The CRAF includes US civilian airlines certified by the Federal Aviation Administration (FAA). The commercial airlines contractually commit aircraft to the CRAF. The government incentivises the commercial airlines that obligate aircraft to the CRAF, with peace-time airlift business. In effect, it is a symbiotic relationship – the CRAF presents benefits and opportunities for both the DoD and US airlines.¹³

The CRAF system, modified to suit our environment, could be emulated.

OVERCOMING HURDLES WITH INGENUITY AND INNOVATIVENESS

It takes a long time to load today's giant airlifters even with sufficient Material Handling Equipment (MHE) and men. The problem is aggravated at a receiving base where all the MHE and ground equipment is not readily available. During an earthquake in Armenia (1988), the IAF had promptly airlifted 35 tonnes of relief supplies to Georgia. But, in the absence of MHE and manpower, the crew of 18 air warriors had to offload the aircraft manually.¹⁴ In Kathmandu

12. K. P. Fabian, "Biggest Ever Air Evacuation in History," *ORAL HISTORY, Indian Foreign Affairs Journal*, vol. 7, no. 1, January-March, 2011, p. 97.

13. Christopher Bolkcom, "Civil Reserve Air Fleet (CRAF)", CRS Report for Congress, Congressional Research Service, Library of Congress, p.2, <http://www.fas.org/sgp/crs/weapons/RL33692.pdf>. Accessed on June 13, 2013.

14. Experience narrated by the captain of the aircraft.

too, aircraft had to wait long hours before they could be emptied and could clear the airport. In the aftermath of the earthquake, the administration had collapsed and there was no effective coordination. As a result, the supplies kept piling up.¹⁵

Most bases are equipped with facilities that reduce manual handling of loads. At remote locations, appropriate MHE could be airlifted in the initial sorties for the smooth conduct of relief operations. Ingenuity and innovation can overcome hurdles posed by lack of equipment or human resource. During the Berlin Airlift they *cut* heavy/ overdimensional equipment (that could not be airlifted in *one go*) into pieces of *manageable* dimensions. Then they flew in the pieces and welded them together again.¹⁶ Due to small improvements and ingenuity by all the stakeholders, the ability to airlift kept improving progressively until, on the Air Force Day (September 18, 1948), they airlifted a record 7,000 tonnes.¹⁷ Elephants were used for loading aircraft in the China-Burma-India sector (1942-45).¹⁸

Ingenuity and innovativeness are force multipliers.

MUSTERING SUPPORT OF THE EVACUEES

Physically fit human resource available at the disaster site can make a valuable contribution, if it can be organised. When a situation demands, assistance of good Samaritans from amongst the evacuees must be sought and accepted without prejudice. The Berlin Airlift owed its success, in part, to the civilian population of East Berlin. They helped build a runway in record time and assisted in loading/offloading the aircraft. They minimised the aircrafts' time on the ground by providing administrative and logistics support to the aircraft. This bonhomie comes naturally during crises.

Just one extra helicopter sortie, thus, generated can save over 25 additional lives.

15. "Aid Boxes Pile up as Victims Despair," *Hindustan Times*, April 30, 2015.

16. Lieutenant General William H. Tunner (USAF), *Over the Hump* (Washington D.C.: Office of Air Force History, US AF, 1985), p. 212.

17. *Ibid.*, p. 209.

18. *Ibid.*, p. 97.

RELIEF MATERIAL: SOME CONSCIOUS CHOICES

Every kilogram of material airlifted must be usable by those at the receiving end; infructuous effort must be avoided. Conscious thought can make a difference. For example, nearly 65 percent of the Berlin Airlift was devoted to carriage of *charcoal*, needed critically for cooking, and heating the houses in the bitter winter. To reduce the consumption of charcoal, practical foodstuff that required less cooking was given preference over others that required more charcoal for cooking.¹⁹

In Uttarakhand, some air effort was devoted to airlifting firewood for the cremation of dead bodies at a time when survivors were still awaiting relief supplies (food, medicines, blankets, etc.) pending evacuation. The choice between airlifting *firewood for cremation* and supplying *the still surviving* is a difficult one, particularly when one is at the cost of the other. People struggling for survival deserve the critical supplies as much as the dead deserve a respectable *send-off*. The authorities present on the spot must convince the local population and the affected people of the actions that are in their favour. They must take the people into confidence while taking decisions that affect sentiments.

This issue deserves a carefully balanced study.

VIP VISITS DURING RELIEF OPERATIONS

In the early stages of the relief operations in Uttarakhand, the media reported visits by VIPs to relief camps; much of such reportage was with adverse connotations. Mediapersons viewed the *use* of resources for the security and administrative arrangements for the VIP visits as a drain on the resources meant for relief operations. The home minister urged the leaders to avoid visiting the camps. Policies could be made to restrict the visits to the bare minimum and only the most essential visits could be planned. If possible, such visits must be postponed to the later stages of relief operations. The visits of the military leadership are operational necessities – a must (any time, any where).

Regardless of the nature of the VIP visit, a *deliberate degree of informality* is desirable. Care can be taken so that such visits do not

19. Ibid., p. 203.

impede operations. Visits for *other than operational reasons* could be deferred till relief operations stabilise. A dignitary could go through a visit as unobtrusively as possible in routine airlift sorties. The following anecdote highlights the spirit in which such visits need to be taken:

Such was the appeal of the Berlin Airlift that many VIPs visited to see the activity. "...so strongly did it capture the imagination of the free world, that we were being visited by national leaders, military men, and well-known journalists from many countries. They all had to put up with a degree of informality. In the very first few days, a party of VIPs bound from Berlin in a C-47 landed at Wisbaden for lunch. When they came back to their plane, they found it loaded with flour."

— Lt Gen William H Tunner
"Over the Hump"²⁰

EXPANDING THE HORIZON

A Mirage-2000 aircraft landed on the Yamuna Expressway in June 2015. A similar capability gained by the transport aircraft fleet can revolutionise airlift capability. In a progressive manner, it might be possible, first, to commence use of the *abandoned/ kutcha* runways in the country and then, after gaining experience and confidence, one could think of landing supplies on roads close to the site of a disaster, if possible.

Conventionally, fixed/ rotary wing aircraft have been used to provide airlift during disasters. Could airships be effective airlifters? Skyliifter, an Australian firm, is developing an airship that will carry up to 150 tonnes over 1,000 km. According to the firm, once developed, the airship will carry rural hospitals and disaster relief centres to remote areas.²¹

Now consider this: airlift platforms (airships included) are all just the means to an end. Their effectiveness depends on their intelligent exploitation. The helicopters that were deployed to douse the fire in

20. Ibid., p. 201.

21. "Giant Airship That can Carry Entire Buildings 2000 km," *The Times of India*, October 6, 2010, p. 21.

Japan's Fukushima Daiichi nuclear power station after the earthquake and tsunami in 2011 were handicapped. They could carry small payload, about 2.5 tonnes, which had very little effect on the blaze. Their *bellies* had to be coated with lead to lessen the effect of nuclear radiation. This lowered their capacity to carry water even further. The pilots who flew those sorties did so at the risk of their lives. A pilotless airship (which may be a possibility in the *not-too-distant* future) with a capacity of 60 to 70 tonnes, would have achieved more tangible results: no risk to lives and much larger quantity of water delivered in every lift. Besides, airships could have effected evacuation of larger numbers of people. Similarly, an airship could have carried hundreds of residents upwind and saved them from the poisonous gases emanating from the Union Carbide pesticide plant in Bhopal (1984).

Large transport aircraft can deliver substantial amounts of relief supplies to nodal points. The distribution to the users (read "the needy"), however, is not possible for want of the means of delivery. Supply dropping by helicopters makes sense but turns out to be resource intensive and expensive. Andreas Raptopoulos in a TED Talk²² suggests use of the *matternet* for delivery of small quantities of supplies upto 2 kg to inaccessible areas over fairly long distances. He recommends the use of quadcopters for delivery of small consignments. According to him, delivery of a consignment weighing 2 kg over a distance of 10 km through the *matternet* would be possible in 15 minutes and would cost about 24 cents.

Investment in research and development is a logical step forward.

AFTERTHOUGHT

Battling with recurring natural calamities has improved the disaster relief mechanism in India considerably. Airlift, which forms the backbone of relief operations, has also improved, qualitatively and quantitatively: the number of people evacuated and the tonnage

22. Andreas Raptopoulos, "No Roads? There's a Drone for That," TED Talk, http://www.ted.com/talks/andreas_raptopoulos_no_roads_there_s_a_drone_for_that. Accessed on June 2, 2015.

hailed are indicators of a credible capability. What is of concern today is the number of lives that are still lost in each disaster.

It is evident that airlift plays a predominant part in providing succour to people in distress; it is a powerful tool in the hands of those managing the relief operations. Although the organisations involved in providing airlift—the IAF, in particular—can move cargo speedily across difficult terrain, they have little control over the type of cargo to be airlifted. Small conscientious changes and effective coordination on the part of the agencies providing the supplies and the support services can make a tangible difference; it can save many more lives.

Kaizen is the key.

Note: The thoughts expressed in this article have been developed from an Issue Brief written by the author in July 2013.²³

23. Gp Capt Ashok K Chordia, "Airlift during Disasters: The Uttarakhand Experience – Can we Save More Lives?", *National Defence & Aerospace Power*, 90/13, July 11, 2013, http://capsindia.org/files/documents/ISSUE-BRIEF_74_AIRLIFT-DURING-DIASTERS-THE-UTTRAKHAND-EXPERIENCE_11-July-2013.pdf

UNDERSTANDING NEW MEDIA AND MILITARY RELATIONSHIP

KRITI SINGH

What's interesting about the shift from an industrial age to a technological age is that we keep inventing new media: movies, records, radio, television, the Internet, and now e-books – and one of the things that's most interesting about the invention of a new medium is watching it reinvent itself as it penetrates the culture.

— David Gerrold, US science fiction screenwriter and novelist¹

Communication has evolved with mankind and the innovations and inventions coming out of the cradle of technology have continuously accelerated this process. New technologies have defined and redefined communication at all levels. However, one has to bear in mind that these new technologies comprise, historically, relative terms. We are not the first generation to wonder at the rapid and extraordinary shifts in the dimensions of the world and the human relationships it contains as a result of new forms of communication, or be surprised by the changes those shifts occasion in the regular pattern of our lives.² Today's

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1. "David Gerrold Quote," *Brainy Quote*, http://www.brainyquote.com/quotes/keywords/new_media.html. Accessed on February 26, 2015.
2. Carolyn Marvin, "Introduction," in *When Old Technologies Were New: Thinking About Electronic Communication in the Late Nineteenth Century* (Madison Avenue, New York: Oxford University Press, 1998), p.3.

world is brimming with colossal volumes of information and infinite ways to communicate that information. As the media sustains information in terms of both creation and dissemination, new technologies have also continuously transformed the media landscape. This paper is an attempt to explore another crucial dimension of the media, known as the new media. The objective of the paper is to understand the term 'new media' in depth, its definition and key concepts, analyse the relationship between new and traditional media, and understand the new media from a defence perspective.

DEFINING NEW MEDIA

In simple terms 'new media' in general refer to the digital media that are interactive, incorporate two-way communication, and involve some form of computing as opposed to the 'old media' such as the telephone, radio and TV. These older media, which in their original incarnation did not require computer technology, now, in the present configuration, also make use of computer technology.³

As defined by the *Oxford Dictionary*, "New media means mass communication using digital technologies such as the internet." The new media is a form of communicating in the digital world, which includes publishing on CDs, DVDs and, most significantly, over the internet.⁴ Another important promise of the new media is the 'democratisation' of the creation, publication, distribution and consumption of media content, and the real-time generation of new, unregulated content.⁵ 'Democratisation' means that the creation of content and its dissemination is no longer under the control of a few, but can be done by anyone who is empowered to access the internet and has the basic skills to produce the content. The trajectory of the new media can be speculated upon but in what form and shape it will redefine itself, is unpredictable.

3. Robert K Logan, "What Are the "New Media"?" in *Understanding New Media: Extending Marshall McLuhan* (New York: Peter Lang Publication, 2010), p.4

4. Ziff Davis, "Definition of New Media," LLC, *PCMag Digital Group*, <http://www.pcmag.com/encyclopedia/term/47936/new-media>. Accessed on July 24, 2014.

5. Vijay Reddy, "Using Social Media to Select a University," in *Information Experience: Approaches to Theory and Practice* (Bingley: Emerald Group Publishing, 2014), p.299.

NEW MEDIA OR OLD MEDIA REINVENTED?

What are the new media? There is no single answer to be given. Even the old media were once new, and the new media are constantly changing and evolving.⁶ The new media, broadly understood, include the use of new communication technologies for old or new purposes, a new way of using old technologies, and, in principle, all other possibilities for the exchange of social meaning.⁷ Historically, the new media were not created overnight but originated from the earlier media. Marshall McLuhan noted that the content of a medium is usually taken from other media, and in the case of the new media, content typically come from the old media. Our understanding of the new media largely comes from looking into the “rear-view mirror,” as McLuhan observed.⁸

As is the case with most all of McLuhan’s ingenious labels for profound relationships in the media, once you begin looking for rear-view mirrorisms, you see them everywhere you turn in history. The telephone was first called the talking telegraph; the automobile, the horseless carriage; the radio, the wireless.⁹ Indeed, the rear-view becomes, for McLuhan, a fundamental operating principle for the evolution of media and their effects.¹⁰ Thus, the new media, although the terms refers to new, are, however, only the traditional media which have been reinvented with the changing times and technologies.

DEFINING CONCEPTS OF NEW MEDIA

The new media are essentially based on six basic concepts, which are: digital, interactive, hypertext, virtual, networked and simulated.¹¹

Digital: In a digital media process, all input data are converted into numbers (0 and 1). In terms of communication and representational media, this ‘data’ usually takes the form of qualities such as light, sound, written text, photographs, etc. These are then processed and

6. Steve Jones, “Introduction,” in *Encyclopedia of New Media: An Essential Reference to Communication and Technology* (New York: SAGE Publications, 2002), p.1.

7. Marvin, n.2, p.7.

8. Jones, n.6, p.1.

9. Paul Levinson, “Through a Glass, Brightly,” in *Digital McLuhan: A Guide to the Information Millennium* (New York: Taylor & Francis, 1999), p.174.

10. Ibid.

11. Martin Lister, Jon Dovey, Seth Giddings, Iain Grant, and Kieran Kelly, “New Media and New Technologies,” in *New Media: A Critical Introduction* (New York: Routledge, 2008), p.16.

stored as numbers and can be output in that form from online sources, distal disks or memory drives, to be decoded and received as screen displays, dispatched again through telecommunications networks or output as 'hard copy'.¹²

Interactivity: At the ideological level, interactivity has been one of the key 'value added' characteristics of the new media. Where the 'old' media offered passive consumption, the new media offer interactivity. The term stands for a more powerful sense of user engagement with media texts, a more independent relation with the source of knowledge, individualised media use and greater user choice.¹³ Examples of interactive technologies are: video recorders, videotext, telephone-based voice response systems, ATM cards, automatic tellers, on-line services, information kiosks, 'intelligent' household appliances and, most importantly, computers and multi-media, internet, intranets, WWW, networked computers, etc.¹⁴

Hypertext: Hypertext is text which is not constrained to be linear. It is text which contains links to other texts. Ted Nelson coined the term around 1965. Hyper media is a term used for hypertext which is not constrained to be text: it can include graphics, video, sound, etc.¹⁵ It is a distinct kind of database system where one can creatively interlink content like images programmes, webpages, audio, videos, etc.

Virtual: Another unique and defining concept of the new media is the element of 'virtual' in them. Virtual in the computer sense means "not physically existing but made to appear by software".¹⁶ Virtual worlds, space, objects, environments, realities, selves and identities, abound in discourses about the new media. Indeed, in many of their applications, new media technologies produce virtualities. Virtual reality is the term used to describe a three-dimensional, computer-generated environment, which can be explored, and interacted

12. Ibid.

13. Ibid., p.21.

14. Jens F. Jensen, "'Interactivity' Tracking a New Concept in Media and Communication Studies," in *NORDICOM Review* (University of Gothenburg, 1998), p.185, http://egov.ufsc.br/portal/sites/default/files/interactivity_tracking_a_new_concept_in_media_and_communication_studies.pdf. Accessed on March 11, 2015.

15. "What Is HyperText?" W3C, January 1, 2014, <http://www.w3.org/WhatIs.html>. Accessed on March 11, 2015.

16. Douglas Harper, Historian, *Virtual Dictionary.com, Online Etymology Dictionary*, <http://dictionary.reference.com/browse/virtual>. Accessed on March 14, 2015.

with, by a person. That person becomes part of this virtual world or is immersed within this environment and whilst there, is able to manipulate objects or perform a series of actions.¹⁷

Networked: The emergence of the new media challenged the old ways of production, segmentation, differentiation of consumers and dissemination of media content. Unlike older ways of mass media where limited messages/content were sent to the homogenous mass audience, the new media brought the concept of targeted audiences where the audience can be selective or can make choices. This transformation initiated the establishment of decentralised networks, which have altered the media and communication progressions.

Simulated: The concepts of 'virtual' and 'digital culture' have a close relationship with 'simulation.' A simulation is a representation of something, not the real thing. It is the act of imitating the behaviour of some situation or some process by means of something suitably analogous. Example: war-game.¹⁸ Simulation is a widely and loosely used concept in the new media literature, but is seldom defined. It often simply takes the place of more established concepts such as 'imitation' or 'representation.' A simulation is certainly artificial, synthetic and fabricated, but it is not 'false' or 'illusory.'¹⁹

NEW MEDIA AND TRADITIONAL MEDIA

The boundaries between the traditional and new media have become blurred. New media technologies enable the same content to flow through many different channels and assume many different forms at the point of reception, thus, they initiated the process of media convergence. Digital media have turned the traditional media landscape inside out, and at the same time, the web, internet, and social media platforms have become subjects discussed in the traditional media as well. Beginning as an elitist technological innovation, which was limited to transmission tasks only, the web has since emerged as a self-contained medium.²⁰

17. "What Is Virtual Reality?" *Virtual Reality Blog*, January 1, 2009, <http://www.vrs.org.uk/virtual-reality/what-is-virtual-reality.html#>. Accessed on March 11, 2015.

18. "Simulation", *Vocabulary.com*. January 1, 2015, <http://www.vocabulary.com/dictionary/simulation>. Accessed on March 11, 2015.

19. Lister, n.11, p.21.

20. Christian Oggolder, "Inside -Outside: Web History and the Ambivalent Relationship Between Old and New Media," in *Historical Social Research* (2012), <http://nbn-resolving.de/urn:nbn:de:0168-ssoar-383804>. Accessed on March 11, 2015.

Colossal Use of Technology: One of the major differences between the new and traditional media is the involvement of the technologies in them. Traditional media like print, radio and television also thrive on technology. However, the new media, from the technological aspect, are based on the foundation of Information Technology (IT) and are immensely influenced by it. For example, websites, wireless network of mobile technologies, and new types of media emerging from computer technologies come under the new media. The new media encompass those technologies that move, store, manage, and allow manipulation of digitised information, whether for news, entertainment, communication, visual or other purposes.²¹

Manipulate, Converge, and Instant: One of the important elements comprises the technologies involved in the new media which are much easier and faster in terms of manipulating the content, or convergence of different types of content, be it audio, visual via internet or the dissemination of content, in comparison to the traditional media technologies. We live in an era of digitally based technologies that allow manipulation of all forms of digitised content that can be converged on broadband (often fibre optics) and easily and instantly transmitted across the planet via the internet.²²

From One-Way to Multiple Model of Communication: After the print, television and radio dimensions of media, the new media are also considered as the fourth dimension. From the perspective of information dissemination, where in the first three media dimensions, the information is disseminated to the audience/listener/viewer in a unilateral or one-sided way and the audience/listener/viewer also receives it in a unilateral or one-sided way, here, the audience plays a passive role.

Nature of Connection Between Media Producer and Consumer: The new media are continuously altering, whereas the old media like print are using new media technologies to remain ahead in the competition. For example, *The Times of India* newspaper, which is the

21. Rayford L. Steele, "Traditional and New Media," in *21st Century Communication: A Reference Handbook* (Thousand Oaks, CA: SAGE, 2009), p.4, *SAGE Reference Online*. Web, June 29, 2012, http://www.sagepub.com/edwards/study/materials/reference/77593_10.1ref.pdf. Accessed on March 9, 2015.

22. Ibid.

highest circulating daily in India, has its own Times Internet division, where the online dissemination of news takes place.

One Source to Multiple Sources of Information: In the traditional model of communication, there is only one source of information. However, in the new media, there are multiple sources of information. The mass media audience is no longer captive; today's media consumer is unique, demanding, and engaged.²³

Blurring Lines Between Producers and Users: In the traditional media, the functioning of producers and users is well marked. However, in the new media, the distinction between information producers and consumers will become increasingly difficult to draw.²⁴ The person who is a user or a consumer can become the producer of content with the help of technology.

Breaching the Gatekeepers: The gatekeeping and agenda-setting functions of the traditional media establishments are bypassed in favour of search engines and directories. Ideally, this means that any person with internet access (still a fairly small number, confined primarily to the developed world) can gain information about any issue, event, or place, without the restrictions of time, expense, geography, and politics that used to limit such information gathering.²⁵

From Passive to Active Audience: The mass media audience is no longer a captive audience; today's media consumer is unique, demanding, and engaging. This has profound implications for traditional business models in the media industry, which are based on aggregating large passive audiences and holding them captive during advertising interruptions. In the new media era, the audiences will occasionally be large, but often small, and usually tiny.²⁶ But in terms of interactivity, this audience is far more active than the traditional audience.

23. CiacuGrasu Nicoleta, "The Impact of New Media on Society", Researchgate. 2014, http://www.researchgate.net/publication/215489586_The_impact_of_new_media_on_society. Accessed on March 11, 2015.

24. W. Lance Bennett, "New Media Power: The Internet and Global Activism," Depts. washington.edu, 2003, <https://depts.washington.edu/gcp/pdf/newmediapower.pdf>. Accessed on March 13, 2015.

25. Alan R. Kluver, "New Media and the End of Nationalism: China and the US in a War of Words," *Mots Pluriels* 18 (2001), <http://motspluriels.arts.uwa.edu.au/MP1801index.html>. Accessed on March 10, 2015.

26. Nicoleta, n.23.

NEW MEDIA AND DEFENCE ORGANISATIONS

From a military perspective, the new media comprise any capability that empowers a broad range of actors (individuals to nation-states) to create and disseminate near-real time or real time information with the ability to affect a broad (regional or worldwide) audience.²⁷ The present scenario has brought a bigger challenge before the defence organisations in terms of handling new media technologies, in the backdrop of the exponential reach, impact and way in which the 'user' content generated on these platforms can be distorted, manipulated and circulated to millions in an instant, and can be used by the enemy to his advantage. The usage of new media technology like in the Israeli-Hezbollah War of 2006, and in more recent times, the social media campaign of the Islamic State of Syria and the Levant provide us examples on how the current information environment has impacted the way warfare is conducted today.²⁸

In order to get information dominance in any given environment, present or future, undermining the importance and strength of the new media can prove detrimental to the defence forces. There is an immediate need to understand the 'new media' as a concept, its technological dimensions, its impact and set of challenges and prospects. In addition, there is a requirement to optimise new media technologies and synchronise these with the aims and objectives of the military so to counter the adversaries' use of the new media, and to subvert their aims. An example is the recent creation of a special force of 'Facebook warriors' in the British Army, especially designed to undertake psychological operations and use of social media to engage in unconventional warfare in the information age. The 77th Brigade, to be based in Hermitage, near Newbury, in Berkshire, is about 1,500-strong and formed of units drawn from across the army. The brigade will be responsible for the non-lethal warfare in the backdrop of 24-hour news, smartphones and social media such as Facebook and Twitter.²⁹

27. Dennis M. Murphy, "Introduction," in *Fighting Back: New Media and Military Operations* (Pennsylvania: US Army War College, 2008), p.4.

28. Ibid.

29. Ewen MacAskill, "British Army Creates Team of Facebook Warriors," *The Guardian*, January 31, 2015, UK News sec, <http://www.theguardian.com/uk-news/2015/jan/31/british-army-facebook-warriors-77th-brigade>. Accessed on May 18, 2015.

The employment of this strategy by Britain's defence forces not only highlights the growing domination of the new media in military operations but also underlines the fact that adversaries are using the platforms of the new media to their advantage and the demon of digital terrorism has been unleashed on our security forces. It also accentuates the immediate need to review the potentials of the new media and advocates a change in the stance of the defence forces from the way they have been previously viewing the media and their impact. For a better understanding, let us take a look at some popular new media to see how they have been exploited by various terrorist organisations, time and again:

- **Abuse of the Internet:** The internet has been the first casualty in the new media technology, which has been continuously abused by the terrorist organisations and adversaries to their advantage. In the view of Ban Ki-moon, secretary-general of the United Nations, "The internet is a prime example of how terrorists can behave in a truly transnational way; in response, states need to think and function in an equally transnational manner."³⁰ It is important to note that the World Wide Web, as a subset of the internet, is essentially ungoverned, providing obvious freedom and caution. The web gives the individual a voice, often an anonymous voice – and a potentially vast audience.³¹ This anonymity and unregulated freedom have been regularly exploited by terrorists and anti-social elements, in terms of using the internet for their own communication and false propaganda, to raise funds and lure people to join their network for coordinating attacks, money laundering, using geo tags, Google earth for mapping, data collection, etc.
- **Abuse of Websites and Blogs:** As new media technologies become easier and cheaper to use, in terms of creation, content consumption, revamping and deleting the websites have become easier. This facility has given terrorist organisations an easier way to communicate from unknown locations with each other and the masses, surpassing geographical locations and

30. "The Use of the Internet for Terrorist Purposes," United Nations Office on Drugs and Crime, 2012, http://www.unodc.org/documents/frontpage/Use_of_Internet_for_Terrorist_Purposes.pdf. Accessed on May 18, 2015.

31. Murphy, n.27, p.4.

time zones. Websites are easily established, dismantled and reestablished, making them valuable to extremist movements. Islamic extremist websites grew from 20 to over 4,000 in only five years.³² Terrorists can use these websites as virtual training grounds, offering tutorials on building ammunition and bombs, assisting as a guide in how to use the weapons at their disposal, shooting at soldiers, and sneaking into the affected areas from abroad, hosting messages and propaganda videos which help to raise the cadres' morale, and further the expansion of recruitment and fund-raising networks.³³

- **Abuse of YouTube:** YouTube can empower individuals to achieve strategic political and military effects where easy upload of their videos, without editorial oversight, allows access to a nearly unlimited audience. Thus, the use of the Improvised Explosive Device (IED) by insurgents shifts from a military tactical weapon to a strategic information weapon when the IED detonator is accompanied by a videographer.³⁴ But the question which comes to mind is that if these platforms have been continuously used by the terrorist organisations for terror propaganda, why they are allowed to put up these videos in the first place? The answer can be summarised in two points: the first is the lack of will to do so. Despite the serious threat posed by extreme and violent videos, neither the big internet companies nor the European Union appear willing to take on a legal battle to enforce their removal.³⁵ Second, the videos of YouTube in terms of data, comprise a colossal figure: "About 300 hours of video material is being uploaded to YouTube every minute, making it virtually impossible for the company to filter all images." Internet giant Google accepted the fact that its video-sharing website YouTube is so inundated that its staff cannot filter all terror related content, complicating the

32. Ibid.

33. Eben Kaplan, "Terrorists and the Internet," *Council on Foreign Relations*, January 8, 2009, <http://www.cfr.org/terrorism-and-technology/terrorists-internet/p10005>. Accessed on May 17, 2015.

34. Murphy, n.27, p.6.

35. "YouTube Too Overloaded to Filter Terrorist Videos," *Cbsnews.com*, January 28, 2015, News sec. <http://www.cbsnews.com/news/youtube-too-overloaded-to-filter-terrorist-videos/>. Accessed on May 19, 2015.

struggle to halt the dissemination of terrorist propaganda and hostage videos.³⁶

COUNTER-MEASURES

- Keeping a tab on the extremist propaganda being shown on various platforms. This monitoring will not only provide a significant amount of knowledge about the terrorists' functioning and activities but sometimes the targets of terrorist organisations are derived from website, chat room, and other internet communications.³⁷ Besides, they leave their digital footprints behind in the form of e-data, which can be exploited. This will also help the defence forces to build a counter-strategy to defeat their propaganda.
- A timely response to the extremist propaganda is indispensable, keeping in mind that a message from extremist propaganda will take less than a second to go viral and be shared by millions who are using new media technologies. Delay in a response will give the adversary greater advantage. Time is of great importance in damage control.
- Constructing a counter-narrative is immensely important while building a counter-strategy to deal with enemy propaganda.
- In a bid to demolish the arguments given by a terrorist organisation to manipulate the perception of the masses, the defence forces can apply strategic communications that provide counter-narratives to the propaganda. These may be disseminated via the internet in multiple languages, to reach a broad, geographically diverse audience.³⁸
- Immediate shut-down of the website and blog working for the enemy can provide temporary relief, however, it is not a long-term solution.
- Targeting the Webmaster, the brain behind the website or blog.
- Creating phony terrorist websites. These can spread disinformation such as instructions for building a bomb that will explode prematurely and kill its maker, or false intelligence about the location.³⁹

36. Ibid.

37. n.30.

38. Ibid.

39. Kaplan, n.33.

- Understanding the importance of the media and their functioning, at both conceptual and application levels is paramount. This understanding will help in building a better strategy to counter the enemy. An ad hoc mechanism will prove counter-productive. Do not get deceived by the user-friendly nature of the new media, particularly the social media. The right message, even with the right intent, but without proper knowledge of the media and its working, can mar the entire effort to counter enemy propaganda.

CONCLUSION

The new media are one of the main forces in accelerating the trend of globalisation in human society.⁴⁰ Due to the thrust of the new media, the global trend creates new social networks and activities, redefines political, cultural, economic, geographical and other boundaries of human society, expands and stretches social relations, intensifies and accelerates social exchanges,⁴¹ and involves both the micro-structures of personhood and macro-structures of the community.⁴² Given their indispensable nature, unchallenging presence, infinite reach and deep impact, it becomes paramount for the defence organisations to understand the new media from the core and optimise their potentials for achieving the military objectives.

40. G. M. Chen and K. Zhang, "New Media and Cultural Identity in the Global Society", in R. Taiwo, ed., *Handbook of Research on Discourse Behavior and Digital Communication: Language Structures and Social Interaction* (Hershey, PA: Idea Group Inc., 2010), pp. 801-815.

41. Guo-Ming Chen, "The Impact of New Media on Intercultural Communication in the Global Context," *China Media Research*, 8, no. 2, 2012, http://digitalcommons.uri.edu/cgi/viewcontent.cgi?article=1012&context=com_facpubs. Accessed on March 11, 2015.

42. Manfred Steger, "Globalization: A Contested Topic," in *Globalization: A Very Short Introduction*, 1st ed (Oxford: Oxford University Press, 2013), p.15.

DEFENCE R&D IN INDIA: CHALLENGES AND OPPORTUNITIES FOR INDIAN INDUSTRIES

PRAKASH PANNEERSELVAM

Over the last 67 years, India has been a significant importer of arms. According to the *SIPRI Year Book 2014*, India emerged as the world's largest importer of arms, accounting for 14 percent of global arms export, which has been increasing year after year. India missed the industrial revolution and this prolonged the process of strengthening of its scientific and industrial base. Moreover, the technological denial to India during the Cold War, further worsened the situation. As a result, India has eventually emerged as a prime importer of weapons. The Research and Development (R&D) and production base created just after the realisation of self-reliance in the 1950s has not matured enough to create niche technology in defence. This has raised concerns in defence circles about India's much cherished dream of achieving self-reliance and indigenisation in weapon systems. In this context, an attempt has been made here to understand the current situation of military R&D and innovation. Since the private industries are optimistic about the future defence industry, it is crucial to study the

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private industry in the defence sector and understand the challenges in the area.

The Defence Research and Development Organisation (DRDO) is the only organisation in India leading innovation in defence. Apart from DRDO, the Defence Public Sector Undertakings (DPSUs) and Ordnance Factories (OFs) have made little progress in defence R&D in developing systems and sub-systems for the Indian armed forces. This has led to import dependency on other countries. The self-reliance index hovering between 30 to 35 per cent, has forced the nation to pay a heavy price to import critical weapon systems and technologies. This has weakened India's bargaining power; moreover, it has also deprived India of knowledge and other benefits associated with it.¹ Strategically, the dependency on foreign sources exposes the capability gap prevailing in the Indian armed forces.

R&D AND INNOVATION IN INDIA

There are two main reasons behind India's poor performance in R&D in the defence sector: firstly the international technological control regimes [Wassenaar Arrangement, Missile Technology Control Regime (MTCR), Non-Proliferation Treaty (NPT) Nuclear Suppliers Group (NSG), Australia Group] prevented India from acquiring high-end technology from the Western countries. This resulted in India facing multiple challenges in acquiring and mastering technology in the defence sector. Secondly, government funding, which is a major source for defence R&D in India, is substantially low compared to global standards. The combination of these factors lowered India's performance in defence R&D.

Funding for Indian Science and Technology (S&T) stagnated for many years. It was only after 2000 that the government raised the funding for it. Even now, India's spending on R&D is below satisfactory level. The *Battele/R&D Magazine 2014 Global R&D and Funding* ranked India eighth in total spending on R&D, way below the US, China, Japan and Germany (see Table 1). Most of the R&D facility is funded by the government, which accounts for more

1. Laxman K Behera, "Private Sector Participation in Indian Defence Industry", *IDSA Comment*, January 8, 2008, http://www.idsa.in/idsastrategiccomments/PrivateSectorParticipationinIndianDefenceIndustry_LKBehera_080108.html. Accessed on March 21, 2015.

than two-third of the total funding source.² Primarily, government sponsored R&D focusses on the nuclear energy, defence, space, health and agriculture sectors.³ However, defence R&D has not achieved its full potential despite the fact that it has been closely netted with the Ministry of Defence (MoD). It is noteworthy that the chief of DRDO is also the scientific advisor to the defence minister.

Table 1: Top 10 R&D Global Spenders

Country	2013		2014	
	GERD (PPP US \$ Billion)	R&D as % of GDP	GERD (PPP US \$ Billion)	R&D as % of GDP
United States	450	2.8%	465	2.8%
China	258	1.9%	284	2.0%
Japan	163	3.4	165	3.4%
Germany	92	2.8%	92	2.8%
South Korea	61	3.6%	63	3.6%
France	52	2.3%	52	2.3%
United Kingdom	44	1.8%	44	1.8%
India	42	0.85%	44	0.9%
Russia	38	1.5%	40	1.5%
Brazil	31	1.3%	33	1.3%

GERD = Gross Expenditure on R&D, PPP = Purchasing Power Parity

Source: "2014 Global R&D and Funding Forecast", December 2013, http://www.battelle.org/docs/tpp/2014_global_rd_funding_forecast.pdf. Accessed on April 7, 2015.

DEFENCE R&D IN INDIA: AN OVERVIEW

Defence R&D and production is considered to be a highly specialised industry in India. However, the sector remains strictly under government control and DRDO is the leading research organisation on defence R&D programmes. DRDO was established in 1958 with the single aim to achieve self-reliance in defence needs. Currently, it has 52 research laboratories spread across India and delivers vital defence equipment to the Indian armed forces. It is also important

2. "2014 Global R&D and Funding Forecast", December 2013, http://www.battelle.org/docs/tpp/2014_global_rd_funding_forecast.pdf. Accessed on April 7, 2015.

3. Ibid.

to note that DRDO's R&D expenditure accounts for 31.6 per cent of the total R&D budget of major organisations. As on August 2013, the value of systems/products/technologies developed by DRDO and inducted into the Services or under-induction stands approximately at over Rs.1. 6 lakh crore.⁴ DRDO is the single entity in India which has exclusive labs to support military R&D and lend technology to the DPSUs and OFs in developing military equipment. However, DRDO is facing numerous challenges to reduce the import content in the weapon systems developed by its labs.

Table 2: Value of Systems/Products/Technologies Developed by DRDO

System/Product/Technology	Inducted (Rs. crore)	Under- Induction (Rs. crore)
Missiles	4,667.79	60,605.69
Electronics and Radar Systems	7,606.19	21,513.75
Advance Materials and Composites	3,504.96	1,38.84
Armament Systems	8,304.33	43,39.75
Aeronautical Systems	3,049.37	23,699.69
Combat Vehicles & Engineering Systems	12,686.43	8,236.89
Life Sciences Systems	246.91	286.29
Naval Systems	873.39	329.93
Total	40,939.37	119,150.82
Grand Total		160,090.190

Source: Ministry of Defence, Government of India, "Increase in Cumulative Production Value of DRDO Developed Systems", *Press Information Bureau*, August 14, 2013, <http://pib.nic.in/newsite/PrintRelease.aspx?relid=98278>. Accessed on March 24, 2015. (Strategic systems are not included.)

DRDO is striving to develop indigenous weapon systems with the help of the domestic industrial base. However, it has been working in this aspect in order to reduce the import content in the weapon systems to make India self-reliant in defence technology. As the secretary of defence production informed the Standing Committee on Defence, "Our R&D set-ups are small. They are meant for reverse

4. Ministry of Defence, Government of India, "Increase in Cumulative Production Value of DRDO Developed Systems", *Press Information Bureau*, August 14, 2013, <http://pib.nic.in/newsite/PrintRelease.aspx?relid=98278>. Accessed on March 24, 2015.

engineering in some small things, may be, producing some small new designs on an existing platform.”⁵ Therefore, the challenge for the country is to gain the ability to innovate technologies in the fastest way to reduce the import content in the major systems developed by DRDO.

Apart from DRDO, Hindustan Aeronautics Limited (HAL) and Bharat Electronics Limited (BEL) are the two major innovative defence enterprises, which spend 6 to 8 per cent of their turnover on R&D.⁶ Other DPSUs and OFs do not have dedicated R&D facilities and are dependent on DRDO or foreign companies for technology for production. The miserly attitude towards R&D by the DPSUs makes India dependent on the import content. Moreover, the Indian S&T sector, led by four institutions namely, the Department of Atomic Energy (DAE), Department of Science and Technology (DST), Council of Scientific and Industrial Research (CSIR), and Indian Space Research Organisation (ISRO) has also made significant contributions towards developing military applications. The involvement of Indian universities, academia and private industries in defence R&D has been somewhat deficient.

Further, in the Indian defence industry, the high dependence on import content, lack of capability to produce crucial technology, inefficiency in providing timely services, nepotism and corruption are some of the major issues that have hindered India from growing into a major defence production agency. In the meantime, the government’s decision to open up defence to the private sector is aimed at speeding up the indigenisation process. In the last fourteen years, the private sector has emerged as a significant player in the Indian defence sector, after the DPSUs and OFs.

PRIVATE INDUSTRIES IN DEFENCE SECTOR

The Indian defence sector was thrown open to private industry in 1991 with an aim to promote defence-industries partnerships. However, private participation was kept at a minimal level,

5. Standing Committee on Defence (2012-2013), Lok Sabha, Ministry of Defence, Government of India, *Demands for Grants (2013-2014) Twentieth Report* (New Delhi: Lok Sabha Secretariat, 2013).

6. Laxman Kumar Behera, “Defence Innovation in India: The Fault Line,” *IDSA Occasional Paper No.32* (New Delhi: IDSA, 2014), p. 17.

confined to manufacture of components, assemblies and sub-assemblies. Then, in 1994, the Ministry of Defence constituted six joint task forces, in collaboration with the Confederation of Indian Industries (CII),⁷ and based on their recommendations, the government opened up the defence sector for private players in 2001. The policy decision was a major breakthrough for the Indian defence industries, allowing 100 per cent equity, with Foreign Direct Investment (FDI) permissible up to 26 per cent—both subject to licensing. Moreover, the Kelkar Committee Report in 2005 recommended major changes in the “acquisition procedures, and enabling greater participation of the private sector in defence production.” All the government measures ensure greater participation by private companies in the defence sector. Despite this, the private industries have a relatively small share—about 5 percent of the Indian defence market. Twenty percent is contracted with the DPSUs, and the balance, more than 70 percent, equipment is imported.

For private industries, the major challenges in the defence sector arise from the DPSUs and OFs. The workforce at the DPSUs is unionised and allows no scope for reform.⁸ The office of the secretary, defence production, which is responsible for defence production and the performance of the DPSUs and OFs, generally tends to overlook ensuring a level playing field for the private sector.⁹ Even the recommendation by the Kelkar Committee on defence acquisition to give a special status to selected private industries at par with the DPSUs under the “Raksha Udyog Ratnas”, was shelved in 2010, due to strong opposition from the DPSUs and OFs. Though the Defence Procurement Procedure (DPP - 2013) has taken some positive steps to address the concerns of the private industries, the latter increasingly feel constrained by the dominant role of the DPSUs and OFs in the defence sector.

7. Mrinal Suman, “Private Sector in Defence Production”, *Indian Defence Review*, June 4, 2014, <http://www.indiandefencereview.com/spotlights/private-sector-in-defence-production/>. Accessed on April 17, 2015.

8. KK Sruthijith, “Why Government Has Failed to Encourage Private Sector in Defence Production”, *The Economic Times*, March 19, 2013, http://articles.economictimes.indiatimes.com/2013-03-19/news/37844195_1_private-sector-defence-production-defence-imports. Accessed on April 12, 2015.

9. Ibid.

At the same time, one should not underrate the positive impact of the DPP,¹⁰ which provides the private sector a level playing field against the DPSUs and OFs. For example, the new DPP guidelines offer flexibility for foreign vendors to choose not necessarily a government agency, but a suitable private partner who can best discharge the maintenance responsibility that the contract specifies.¹¹ Even the Defence Ministry has asked the Finance Ministry to provide private companies exchange rate protection,¹² to treat the private sector at par with the DPSUs and OFs. In order to facilitate the small and medium scale industries, "SIDBI has decided to earmark an amount of Rs. 500 crore for providing loans, and further, a fund of Rs. 50 crore for equity support out of the 'India Opportunities Fund' managed by its subsidiary, namely, SIDBI Venture Capital Ltd."¹³ Despite a few hiccups, the defence manufacture sector remains a major lucrative sector for the Indian private industries.

The private industries have played a key role in aiding the defence agency in building state-of-the-art weapon systems, and major industrial houses have already made their presence felt in the defence sector. Moreover, the private sector's capability in building the INS *Arihant's* hull, control system and system for the steam turbine has showcased the private industry's contribution in the defence sector. Also, the Indian aerospace and defence electronic sectors are

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10. The following are the highlights of the amendments to the DPP – 2011: (1) prioritisation of various categories for capital acquisition under the Defence Procurement Procedure; (2) release of public version of the Long-Term Integrated Perspective Plan (LTIPP); (3) Maintenance ToT (MTOT) no longer through nomination; (4) advance consultations for "Make" procedure; (5) simplification of "Buy & Make (Indian)" procedure; (6) clear definition of indigenous content; (7) ensuring faster progress in "Make" and "Buy & Make (Indian)" cases; (8) defence items list; (9) licensing for dual use items; (10) consultations on security guidelines for Indian defence industry; (11) resolution of tax-related issues; (12) funds for Micro, Small and Medium Enterprises (MSMEs) in the defence sector; (13) efficiency and transparency in defence procurement: (14) enhanced delegation of financial powers; (15) powers to DAC.
 11. So far, maintenance, repair and overhaul contracts have largely been reserved for the DPSUs and OFs.
 12. Ajai Shukla, "Private Defence Companies Get New Playing Field", *Business Standard*, May 27, 2013, http://www.business-standard.com/article/companies/private-defence-companies-get-new-playing-field-113052701193_1.html. Accessed on March 12, 2015.
 13. Ministry of Defence, Government of India, "DAC Approves Major Changes in DPP to Encourage Indian Defence Industry," *Press Information Bureau*, April 20, 2013, <http://pib.nic.in/newsite/mbErel.aspx?relid=94799>. Accessed on April 27, 2015.

venturing out and partnering with foreign vendors and adding value to the Indian market. The entry of Indian private companies into the international market certainly projects Indian private companies as making inroads in the defence sector, both globally and locally.

There is a big opportunity for Indian private companies at both national and global levels. Presently, with 30 per cent expenditure on Indian indigenous production, the current market size is approximately Rs 23,850 crore. The government is keen to achieve 70 percent indigenisation by 2020.¹⁴ So, in 2020, even if the indigenous production reaches 50 percent, the market would rise to US \$ 15.7 billion. Even if the DPSUs and OFs get the major share, the private sector would still have a large share in the defence sector. Globally, military spending is increasing, constantly proving to be an opportunity for the Indian private sector to export military equipment to friendly foreign countries. To compete with the global and domestic markets, it has become mandatory for the private industries to invest in military R&D.

DEFENCE R&D IN PRIVATE SECTOR: ISSUES AND CHALLENGES

Private industry's R&D in India (Table 3) focusses on support to its service sector, which accounts for about two-third of India's Gross Domestic Product (GDP).¹⁵ According to the Department of Science and Technology, in 2014, Indian private industry's investment in R&D stands at around 39 percent.¹⁶ The White Paper also specifies that "private sector investment into R&D is less than optimum levels in comparison to the current trends in global best practice."¹⁷ Major R&D and innovation in the private industries are primarily focussed on pharmaceuticals, automobiles, software and information management, food production, etc.

14. "India Aims at 75 Percent Indigenisation in Defence in 2020-2025", *Zee News*, June 15, 2014, http://zeenews.india.com/news/nation/india-aims-at-75-per-cent-indigenisation-in-defence-in-2020-2025_939664.html. Accessed on March 16, 2015.

15. n. 2, p. 19.

16. Department of Science and Technology, Ministry of Science and Technology, Government of India, *White Paper on Simulation of Investment of Private Sector into Research and Development in India* (New Delhi: Department of Science & Technology, GOI, May 2013).

17. *Ibid.*, p.5.

Table 3: India's Private Industrial R&D

	2010 R&D (In US\$ million)	R&D % Revenue
Tata Motors	397.8	1.50%
Prithvi Information	246.3	60.50%
Polaris Software	228.0	67.60%
Mahindra & Mahindra	157.2	2.50%
Lupin	112.7	9.30%
Infosys	112.0	1.90%
Reliance	110.0	0.20%
Core Projects	96.2	53.40%

Source: 2014 Global R&D and Funding Forecast", December 2013, http://www.battelle.org/docs/tpp/2014_global_rd_funding_forecast.pdf. Accessed on April 7, 2015. (EU Industrial R&D Scoreboard)

In terms of research in military technology, the private sector is yet to dedicate an in-house R&D facility. The government's neglect of the role of the private industries in the defence sector for decades lowered the confidence of the industry when it came to building military technology. After the opening up of the sector in 2001, the private industries geared up to exploit the potential in this sector. During this period, the Indian private companies also advanced their understanding of the defence sector by mastering defence technologies. Industrial collaborations and Joint Ventures (JVs) proved to be major stepping stones for private companies in India to acquire knowhow in crucial technologies. So far, only some private companies (see Table 4) have acquired capability in developing military application domestically and reducing the huge import content in Indian defence equipment.

Table 4: List of Private Players and Technological Knowhow

Name	Technology Knowhow
TATA Power SED	Network-centric warfare enabler, etc.
L&T EADS	Tier I sub-systems in avionics
Centrum Group	Advanced radars, crystal oscillators
Quest	Cross-disciplinary aerospace engineering
Bharat Forge	Artillery and specialised vehicles

Source: Suprotip Ghosh, "Going Great Guns", *Business Today*, March 2, 2014, <http://businesstoday.intoday.in/story/private-sector-manufacturing-of-defence-equipment/1/203170.html>. Accessed on April 6, 2015.

Observing the investment by both private and public sectors, the government, on many occasions, has asked the military industries to abandon their miserly attitude in this regard. The government is inclined to invest more money in R&D and has in a way ensured that it will not allow R&D in defence to suffer for lack of finance. Therefore, the MoD assures that it will finance 80 percent of the development cost and will give assured orders to the private industries so that they may successfully develop the prototypes. The report by the Department of Science and Technology on "Simulation of Investment of Private Sector into Research and Development in India" provides insight into private sector R&D and the various incentives given by the government to encourage in-house R&D.¹⁸ Despite the government's assurance at various stages, the private sector lacks confidence to invest in military R&D.

Apart from investments, there is a need to address the policy issue in defence procurements and the Indian defence manufacturing sector. The absence of an organisational mechanism that is responsible for setting policy goals, and bringing users, R&D and production agencies into a single fold is the biggest challenge that the defence industry is facing at present.

Private industries recognise the need for future innovation and have cited two challenges, which are blocking the confidence of industry from investing in defence R&D: (1) the Indian armed forces are the only market; and (2) the private sector will probably invest only after ascertaining the viability of a product's fructification in a realistic

18. n. 16.

timeframe. Primarily, the industry is pinpointing the ambiguity in the defence production policy and the unfavourable manufacturing policy as hindering the growth of private industry in defence R&D in India. Additionally, lack of a risk taking mindset as well as incentives, and less scope for commercialisation hold back the private sector from investing in military R&D. Without developing an effective system to bridge the technological capability, no country can aspire to display strategic autonomy in the contemporary world. Therefore, the government should allay the fears of the private industries by engaging them positively and providing incentives and tax benefits to nurture an R&D culture in the private sector. Thereby, both public and private sectors can step up onto the same plank and go in for defence R&D and innovations.

“MAKE IN INDIA”

Prime Minister Narendra Modi launched the “Make in India” programme to provide a boost to the Indian manufacturing sector. The defence manufacturing sector certainly has huge capability and capacity to stimulate growth in the economy and provide employment opportunities to the Indian government. It has been given major preference over other manufacturing industries to boost investor confidence in this rapidly growing sector. The present government also understands that it is necessary to encourage R&D in defence to increase the manufacturing capability of the Indian defence industry. Accordingly, the government has promised to give preference to ‘Buy (Indian)’ and ‘Buy and Make (Indian)’ over outright purchase of equipment from foreign Original Equipment Manufacturers (OEMs). The government and department of defence production have made specific provisions for maintenance of Transfer of Technology (ToT) to Indian industry partners, and preference to manufacture of defence equipment in India to promote R&D in India. In addition, the Department of Science and Technology has been eagerly attempting to enhance R&D in high-end technology..

Among the recent policy changes, the Indian government is also moving towards creating a level playing field for the private sector in the defence sector. Some of the major policy initiatives by the Ministry of Defence to boost confidence in the defence manufacturing sector, are as follows:

1. ***Technology Perspective and Capability Roadmap (TPCR)***¹⁹
TPCR provides a list of details of equipment and technology required by the Indian armed forces. This provides the industries an overview of the Indian armed forces' future requirements.

2. ***Increase in Defence FDI***²⁰
FDI in the defence manufacturing sector was increased from 26 per cent to 49 percent through the Foreign Investment Promotion Board (FIPB) route and over 49 percent with the approval of the Cabinet Committee on Security (CCS).

3. ***Revision of DPP: Preference to "Make" and "Buy and Make (Indian)"***²¹
Preference is given to Indian industry in procurement. The procedure for the 'Buy and Make (Indian)' category has been simplified to enable the category to attract private industry into the defence manufacturing sector. More clarity on indigenous content has been provided under the DPP to enhance indigenisation in defence products in India.

4. ***Delicensing***²²
The defence product list for the purpose of industrial licensing has been revised and most of the components/ parts/raw materials have been taken out of the purview of industrial licensing.

5. ***Defence Export Strategy***²³
The Standard Operating Procedure (SOP) for issuing the No Objection Certificate (NOC) for export of military stores has been simplified and the process for issuing NOCs has been made online.

19. For more details, see Ministry of Defence, Government of India, "Technological Perspective and Capability Roadmap (TPCR)", April 2013, mod.gov.in/writereaddata/TPCR13.pdf. Accessed on April 2, 2015.

20. Ministry of Defence, Government of India, "Self-Dependency in Arms Production", Press Information Bureau, May 12, 2015, <http://pib.nic.in/newsite/PrintRelease.aspx?relid=121584>. Accessed April 15, 2015.

21. Ibid.

22. Ibid.

23. Ibid.

6. *Technology Development Fund*

The government has announced a Technology Development Fund (TDF) with an initial amount of Rs 100 crore to support defence R&D in India.

7. *Make in India*

The government is giving special preference to Indian industries willing to venture into defence manufacturing under the “Make in India” category.

The recent policy directions from the Government of India are likely to give the manufacturing industry a boost in the defence sector. However, lack of a concrete policy to enhance R&D in defence might not allow the manufacturing industry to grow—rather, it will become dependent on foreign OEMs for technology and development. Mere production of equipment will not enhance India’s capability in defence technology. Therefore, India should have a much more focussed approach to enhance innovation and R&D in the defence sector.

CONCLUSION

The MoD has demonstrated its commitment to indigenise defence procurement by defining a hierarchy of categorisation in favour of indigenous players. However, to make this policy effective, it is essential to facilitate accelerated product development in the industry. It is relevant to note that in countries where private sector engagement in R&D is large, the time for the commercialisation of technologies is shorter and the extent of commercialisation of public funded research is generally lower. Hence, it is in the national interest to stimulate the private sector’s engagement in R&D and aim to create Public Private Partnerships (PPPs) in defence R&D.²⁴

While there is need for considerable investment and intervention from the government in the field of R&D, as a growing economy, the Indian government has many sectors to invest in, with limited budgets. Hence, a two-pronged approach towards supporting R&D initiatives and encouraging the participation of Indian industry in R&D is recommended.

24. n. 16.

1. Allocation of sufficient funds for defence R&D and promoting Indian industries to set up R&D facilities.
2. Incentivising R&D by commensurate benefits being granted on investments as well as on commercialisation of the R&D into products and services.

The defence industry is highly technological driven and it is important for both the public and private sectors to realise the importance of developing R&D. The private sector possesses a huge advantage over the government undertakings because it has a better capability to adapt to rapidly changing technology. Fostering strong public-private partnership in defence R&D will help India achieve indigenisation in military technology.

The views expressed are those of the author and do not necessarily reflect the views of CII.

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