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The epic US-China tech battle to
reshape the world order



US makes an honourable exit from
Taliban talks



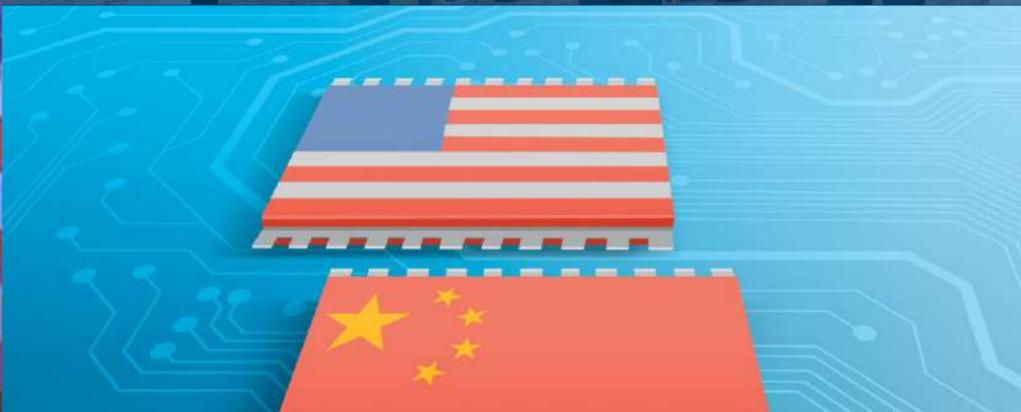
Predicting the next 30-year political
cycle in the Middle East



Finally, an integrated Indian
defence architecture



Populists and the future of liberal
democracies



Who's leading the quantum
computing race?

ED DREAMS, BRIGHT FUT JRES.



I The epic US-China battle for tech supremacy

Synergia Foundation hosted its 60th Roundtable Conference on “US-China Technology Conflict and Lessons from the Peloponnesian War”. The roundtable discussion featured keynote address by Dr AJ Paulraj, Professor Emeritus at Stanford University.

Paulraj is the inventor and a pioneer of Multiple Input Multiple Output (MIMO), a method for multiplying the capacity of a radio link. MIMO has become an essential element of wireless communication standards including Wi-Fi, 3G, WiMAX (4G), and Long Term Evolution (4G LTE). Paulraj has authored over 400 research publications, several books that are part of university curricula, and has about 800 US patents. He has also founded three wireless technology companies in the US which were later acquired by Intel, Broadcom and Hewlett Packard Enterprises. His recognitions include the Friendship Award, the highest award of Government of China for foreign citizens, US Government National Inventors Hall of Fame, the Marconi Prize and the IEEE Alexander Graham Bell Medal. He is a fellow of several National Academies in Engineering and Sciences in the US, China, India and Sweden. Paulraj served the Indian Navy for 25 years where he developed ASW Sonar Technology. His recognitions in India include the Padma Bhushan.

Background

China has never attempted to conceal its ambitions for technological pre-eminence. Its desire is to emulate the US and eventually occupy the top spot in the world of technology. Discarding Mao’s adage that ‘power flows from the barrel of the gun’ China now seeks to rival US, and achieve world dominance through the route of scientific excellence.

According to Paulraj, the ongoing trade war between US and China is just one symptom of the larger conflict for technological superiority. Fearful of being overtaken and ultimately overwhelmed in this chase, US has begun to go after China’s strengths (e.g. Huawei) including its economy which feeds its scientific quest with a vengeance. The US is cutting the cord of 40 years of Sino-American scientific and economic engagement that brought strategic and financial benefits to both sides.

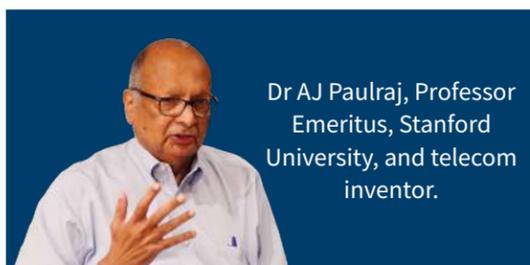
The US is convinced that there is a real threat of China dislodging it as the world’s leading technological powerhouse. “Very dangerous,” is how President Donald Trump recently described the situation when talking about the Chinese telecommunications company Huawei.

Analysis

Thucydides, a soldier and historian wrote in his seminal work *The History of the Peloponnesian War* (Athens vs Sparta), that when a rising power challenges a ruling power, war is inevitable. History of the past 2400 years has largely proven Thucydides right. The question now is whether the Sino-US high tech rivalry will translate into something more deadly and lead the two giants, and the world, on a calamitous path.

Due to his close association with Chinese academia and industry spread over decades, Paulraj enjoys deep insights into the mindset of the Chinese. The analogy quoted by him from the Peloponnesian War places the US-China technological rivalry in the right perspective.

Paulraj has been a witness to China’s meteoric rise. According to him, emerging from the ashes of Mao’s cultural revolution, China began the quest to seek its rightful place in the global community. Smarting over 100 years of humiliation by Western powers and Imperial Japan, China sought to harness technology to spur its rise. China invested its newfound economic wealth to train its scholars at the best institutes around the world, it turned itself into the factory of the world in order to not just fill its coffers, but to be able to gain pole position in the knowledge economy. It reverse engineered western technology, often stole it, and now it has begun to innovate and invent. Every day, hundreds of patents are being filed by the Chinese. Today’s China is a leader in 5G, AI, biotechnology and quantum computing.



Dr AJ Paulraj, Professor Emeritus, Stanford University, and telecom inventor.



A nation’s ambition to achieve technological pre-eminence needs long term vision and the commitment to put the vision into effect. China has proved that as a nation it is up to the task.



Paulraj explained how Comprehensive National Power (CNP) is intrinsically linked to a thriving economy which feeds off mass-marketed technology. Real wealth in immeasurable quantity comes from mass-marketed high technology sold at a premium which is thousands of times its material value. As examples, he cited civil aviation, Information Communication Technology (ICT), pharma (biotech and molecular research) and in the near future Artificial Intelligence (AI) and Robotics.

President Xi Jinping calls the strategy “catch up and surpass” or *ganchao* in Mandarin. For leaders from Mao to Xi Jinping, technological progress is not only a means to power but also an ideological end in itself.

A nation’s ambition to achieve technological pre-eminence needs long term vision and the commitment to put this vision into effect. China has proved that as a nation it is up to the task for it thinks not in terms of days but in decades, in stark contrast to the culture in liberal democracies where electoral compulsions drive the pace. Sometimes, policies do not survive a month!

Assessment

- Indians lack the passion to enquire into the realms of technological frontiers to invent and innovate. Dismally few patents are registered by Indian inventors. Till India gets rid of this mindset, it will continue to lag behind as a second-rate provider of services.
- China has been restrained in its response to US tariffs. Reverse tariffs by China have not been extreme ones. If China decided to prohibit Apple from operating/selling in the country, as US has done with Huawei, the collapse of the American tech giant might become a possibility. This is a silver lining on otherwise dark clouds.

- US seems to be looking for a Berlin War between US-China and there will be no room left for talks in that case. Therein lies the danger for rest of the world who will be forced to pick sides in this conflict, a second cold war, albeit a technological one, being in the offing.
- Paulraj regretted India's failure to tap into its extraordinary potential, blessed as it is with such high-quality human resources. Foreign companies are reaping the benefits of the cerebral capital which they hire in hubs like Bengaluru.
- Overseas Indian inventors like Paulraj have offered IPs to India in vain. The Indian bureaucracy refuses to take a long-term and strategic view of the world.

COLUMN: By Invitation



By KRISHNAN SRINIVASAN

Liberalism and populism are not polar opposites

Two noteworthy recent books, Rudrangshu Mukherjee's *Twilight Falls on Liberalism* and David Runciman's *How Democracy Ends*, predict a bleak future for democracy and liberalism. Mukherjee calls ours 'the worst of times', when the values of freedom of speech and dissent, tolerance and respect for institutions of democracy are under attack, while Runciman contends that voters everywhere distrust their elected representatives. Western democracy – the flagship model – has ceased to work and failed to deliver, and is headed for a long-drawn out demise. It has become 'civil war without the fighting', and managed to prolong its career only through widening the franchise, empowerment of women, LGBT rights and so on, but could come to a close as a result of nuclear war, climate change, the prevalence of evil like the Islamic State, or the malign intrusion of Artificial Intelligence. He regards the three alternatives to liberal democracy as pragmatic authoritarianism, epistocracy and liberated technological transformation; the first two have advantages over present-day democracy in terms of rapid economic growth, and the third is yet uncharted territory.

Liberalism harbours contradictions; embedded in liberalism are liberty, equality and freedom from coercion; the autonomous rational individual's right to life and property and the right to resist unjust authority. The role of government was to be minimal and its legitimacy based on consent and trust; mutual toleration and pluralism should prevail. Yet the individual was threatened by the tyranny of the majority: in the tension between majority rights and individualism, liberalism was situated in conflict with democracy. Liberalism is prone to transform when associated with power, and becomes 'the first victim in a perceived crisis'.

Emphasis on the individual could lead to anarchy, and the benefits of freedom and liberty reduced to the level of the individual could reduce liberty. Not every democracy is liberal and not every theoretically liberal society is fully democratic. Many democracies are liberal in economic matters and illiberal when it comes to social issues. In the European Union, the self-styled epitome of liberal democracy, Prime Ministers Viktor Orban of Hungary, Matteo Salvini in Italy, and Mateusz

Morawiecki of Poland have earned the ire of the EU for arbitrary behaviour and challenging the dirigisme of Brussels. Outside Europe, leaders like Narendra Modi in India, Recep Erdogan of Turkey, Rodrigo Duterte in Philippines, Jair Bolsonaro of Brazil and Donald Trump of USA are described as 'populist', an appellation amorphous and undefined, and applied to those legitimately elected – some on numerous occasions and immensely popular in their own countries – but who displease the secular intelligentsia.

Insistence on an arbitrary division between liberalism and illiberalism obscures the inconvenient truth that a range of alternatives exists between these ideological poles. Not since the 1930s has Europe's political stability and democratic consensus been under greater stress. Britain has become a liability, preoccupied as it is with a mutually damaging Brexit process.

Liberalism and liberal democracy are multi-faceted and relatively modern political phenomena whose historical longevity should not be taken for granted. Imperialism and the priorities of empire were a travesty of liberal universalist pretensions, and the last century saw the outburst of violence, inequality, racism and single-party domination with little opposition other than moral outcry. Post-1990 there was an attempt at universalisation of western liberal democracy as the final form of human government but the western cheerleaders for democracy, individual human rights and liberalism trampled underfoot the sovereignty of states guaranteed under the United Nations in order to effect regime change in countries like Iraq and Libya, with



catastrophic outcomes. The Enlightenment that promoted truth through reason and gave rise to liberal values inspired the western urge to bring these values in an expeditionary manner to unenlightened parts of the world, but these impulses to build utopia of equality, liberty and fraternity stopped short at allies where strategic partnerships are deemed more important than liberal values.

In India, politicians have entrenched themselves in extreme attitudes and lowered the rhetoric of political discourse to unprecedented depths; no merit is ever seen in the actions of those of a different political persuasion, and those who call for greater rationality are derided. The partisan media also have much to answer for, in using expressions that have no place in a people's democracy, like anoint, throne, crown and ruler for election winners. Bangalore historian Ramachandra Guha was prevented from assuming a professorial post at a Gujarat university by bigoted right-wing Hindus, and in the American University of Virginia two Visiting Fellows were boycotted and forced to resign because they had briefly served in Trump's White House. The moral is that liberal bigotry is as pernicious as illiberal fundamentalism.

Srinivasan is a former Foreign Secretary of India. He is the author of eight books including *Values in Foreign Policy: Investigating ideals and interests* published in 2019

COLUMN: By Invitation



By HAIM TOMER

Future of security in the Middle East

To grasp the complexities of the Middle East, it is necessary to understand the historical factors that have shaped the region.

The history of the Middle East over 100 years is influenced by the “generation syndrome”. Every 30 years or so, the political system has undergone a transformation. The younger generation, disillusioned by the political system it inherited, has sought to import and impose a new political agenda.

In the first two decades of the 20th century, there was an inclination to adopt Western democratic principles. This was visible in Egypt and Iraq then under the influence of the British mandate, and in Syria and Lebanon under the French. In the 1950s, as Communist Russia became a dominant power, the younger generation tilted towards socialism. The Young Officers coup in Egypt in 1952 quickly spread to Syria, Libya, Yemen and finally Iraq. With the Cold War at its peak, the major Arab countries stood alongside the USSR against the West. Israel was the American agent in the region.

Thirty years later, the Islamic revolution swept through the region, overthrowing the Shah and ushering in Ayatollah Khomeini in Iran.

The Iranian revolution inspired a host of Islamic parties all over the Middle East. This new generation infused with religious fervour is exemplified by the Muslim Brotherhood who were involved in the attempted assassination of President Assad in 1981, an act carried out by his own soldiers. A year later came the Islamic mutiny against his regime in Syria. The same year Hezbollah was established in Lebanon and followed by the Hamas faction in Palestine (1986). This was the era of the big Islamic wave!

Fast forward thirty years to 2010 and we see yet another transformation. The Arab Spring which blossomed in Tunisia and spread like wildfire over the entire Middle East. It was a clear and resounding call for long due social changes in a society which had remained feudal in character despite the trappings of socialism. It arose from the ruins of Arab economies modelled on Soviet communism.

But the lack of relevant and efficient political platforms coupled with strong ethno-religious roots changed the course of Arab Spring from a social revolution to an ethno-religious conflict as we see it today.

Analysis

At the politico-religious level, the two main players are the Shiites and the Sunnis. As a matter of fact, this includes Iran and its satellites in the region, namely Hezbollah and the Houthis in Yemen on one hand and the Sunni conservative regimes like Saudi Arabia and the other Gulf States on the other. The region today is more politically and ethnically divided than ever.

The Middle East was the battlefield of big power rivalries during the Cold War. President Donald Trump’s policy of putting “America First” is somewhat isolationist. On the other hand we have all seen a throwback to the old Soviet Russia policy of manipulating the flow of events in the Middle East under Putin. He has actually driven the outcome of the Syrian civil war by dispatching military forces which fought alongside the Iranian/Hizballah troops against the Syrian opposition. That changed the balance of power in the Middle East the international competition in the region, and in some respects leaves it open to a much greater Russian influence.



As regards the future of the Middle East, one should bear in mind that it has become one of the least stable regions of the world with a couple of active civil wars, a potential nuclear race, and with a permanent reservoir of extremist Islam which could give birth once again to another wave of international Islamic terrorism following the footprints of Al-Qaida and ISIS.

Assessment

- Five pertinent questions can sum up the future hanging over the bleak skies of the Middle East.
- The need for a new Sykes-Picot Plan: A new grand plan which would take into consideration the new ethnic forces and their ambitions, including that of the Palestinian people, as it was accomplished in the Balkans in the beginning of this millennium. Without such a reshaping of boundaries, it will be quite impossible to bring stability and peace in the region.
- Another issue deals with the possibility of a new big war in the region. Here, one should not underestimate the current tension between Iran and Saudi Arabia, and Iran and Israel. These are the two big potential flashpoints for the next big wars. An outbreak of such a war would inevitably draw in participants from outside the region.
- The next big question which begs an answer is the future of autocratic regimes. The popular discontent is so high in these countries that it is not too risky to predict that the region is ripe for a fresh wave of civil unrest that could easily turn violent. New possible waves of civil protest including ones of a violent nature.
- Terrorism: The Middle East, despite the dismantling of ISIS, remains a fertile ground for the emergence of new Islamic terror movements.
- The Nuclear race: The Middle East remains a hot bed for suppressed nuclear ambitions. Not only Iran but also Egypt and Turkey are attracted by the idea of nuclear capability. The world’s biggest concern should remain the likelihood of a nuclear race in this volatile region, especially in the light of the shrinking international influence and the challenges that the local regimes have been facing internally.

Haim Tomer is the former chief of Israeli foreign intelligence, counter terrorism and international operations. He currently is a cyber security advisor.

Russian Far-East on India's radar



PM Modi's visit to the Russian Far East, the first ever by an Indian PM, aims at economic inroads into this resource rich area in direct competition with China and other countries.

Background

Russia's Far Eastern Federal District is the largest (nearly twice the size of India) and the least populated among the country's eight federal districts.

While the Russian Far East has only around 6.3 million people, it has a wealth of natural resources. Timber, gold, diamonds, other minerals natural gas is found in abundance. To attract investments in this rich but frozen and faraway province, Russian has announced the creation of an agricultural SEZ, the Vladivostok Free Port Project, and also invites participation in the timber and mining business. The opportunities for Indian businesses are immense. Modern infrastructure and technological advancements have opened up several routes hitherto inaccessible. For India, adding Siberian oil and gas to its energy mix would help to cut down its near-total reliance on supplies from the Middle East.

With such possibilities beckoning, India's Prime Minister Narendra Modi announced a \$1 billion line of credit for the development of the Russian Far East during the recent 20th India-Russia Annual Summit.

Analysis

India's interest in the Russian Far East is in keeping with its 'Act East' policy. The region is vital to achieving the \$30 billion bilateral trade target the two countries have set for 2025. In recognition of the economic value of the Russian Far East, India established a Resident Consulate in Vladivostok in 1992, the first country to do so.



In September 2017, the then Indian Foreign Minister Sushma Swaraj attended the Eastern Economic Forum and initiated the process of Indian involvement in the development of resources of the Russian Far East. Preliminary talks on an alternate shipping route between Chennai and Vladivostok also took place.

During this summit, India and Russia agreed on a full-fledged maritime route between Chennai and Vladivostok. Commenting on this, Mr. Modi said "When ships will start plying between Vladivostok and Chennai with the opening of the maritime routes between the two cities, the Russian port city will become the springboard of northeast Asia market in India". He added that the partnership between India and Russia in the development of the Far East will make it a "confluence of open, free and inclusive Indo-Pacific". Mr. Modi's comment has to be viewed in light of the fact that China has been aggressively pushing to expand its military presence in the Indo-Pacific region.

India's current engagement with the region is limited to isolated pockets, such as the Irkut Corporation in Irkutsk where the MIG and Sukhoi aircraft are built. India's state-owned exploration firm ONGC has invested more than \$6 billion in the Sakhalin 1 project. KGK, a large Indian gems and jewellery firm has been granted a certificate of residence for the Vladivostok Free Trade Zone, offering it tax and customs preferences, and lower shipping costs.

Despite US sanctions on Russia, India maintains deep defence ties with Moscow, which has been the corner stone of the relation. Between 2008-2012, India bought 79% of its weapons, measured by value, from Russia. In 2018, India and Russia formally signed a multi-billion-dollar defence deal: \$5.2 billion for five regiments of the S-400 air-defence shield, \$2.2-billion to procure four new warships for the navy, and \$1.1 billion for new medium-lift helicopters to be used by both the defence and home ministries.

India went ahead with defence procurement deals despite warnings from the Trump administration that such purchases from Russia would be considered a "significant transaction" and could result in tough US sanctions.

Assessment

- At a time when Moscow and Beijing are fostering closer ties to counter the West, India has taken advantage of Moscow's call to build strategic reliance through the Eastern Economic Forum, thus limiting reliance on China.
- Now that Russia has extended support for India's bid for a place in the UN Security Council and the Kashmir issue, India recognises the criticality of the relationship and the need to strengthen it with meaningful actions, rather than mere platitudes.
- Russia has also recognised India's work in Afghanistan and support for the current government which is vital for the country's long-term peace and stability.
- The Vladivostok-Chennai sea link, apart from being a viable trade route which will help in the upscaling trade relations between the two nations, will increase India's presence in the Indo-Pacific, and especially the South China Sea, a deeply contested patch of the ocean that Beijing considers its own backyard.
- It will also reduce travel time to 24 days from the current over 40 days it takes to transport goods from India to Far East Russia via Europe, which will boost trade.
- The Vladivostok-Chennai sea link can also be viewed as a counter to China's Maritime Silk Route (MSR) plan as part of One Belt One Road project. China's ambitious MSR plan is about establishing and hence directly controlling the Asia-Africa sea route.
- While the increase in Indian maritime traffic in the Indo-Pacific will justify Indian Naval presence in international waters there, the greater ability of Chinese Navy to interdict this sea route must be taken into account by security planners once there is an increase in the number of Indian merchant ships/ India bound ships plying this route.
- Russia is keen to develop ties with India which offers a huge consumer market for Russian goods, while the Russians have long enjoyed Indian teas, spices, and fabrics. The move to open up alternative sea routes makes economic and strategic sense for both, and indicates that China is not the only player when it comes to Silk Road developments.

I Mayday for the US in Afghanistan



President Trump, in a surprise move, cancelled the ongoing negotiations with the Afghan Taliban. Is the move a negotiating tactic, or does the US see no room for a dialogue with Taliban driving an uncomfortably hard bargain?

Background

From about 100,000 in 2010, the US today deploys about 14,000 soldiers in Afghanistan. This is in addition to 17,000 soldiers from the NATO allies. Responding to popular domestic demands for a troop withdrawal from Afghanistan in October 2018, President Trump initiated direct peace talks with the Taliban at Doha, Qatar with former US Ambassador to Afghanistan Zalmay Khalizad as the special envoy.

The US went out of its way to get the Taliban to the negotiating table, even keeping out the elected government of Ashraf Ghani from the parleys—a key demand of the Taliban. The Taliban considers the Ghani government illegal. This exclusion raised fears that the Taliban was being granted *de facto* legitimacy and primacy in and future Afghanistan regime.

An honourable exit would greatly help to improve Trump's prospects in the forthcoming US presidential elections.

A recent terror attack, claimed by Taliban, which also killed a US soldier, resulted in the Doha talks being called off. On 7 September 2019, President Trump tweeted, "*If they [Taliban] cannot agree to a ceasefire during these very important peace talks, and would even kill 12 innocent people, then they probably don't have the power to negotiate a meaningful agreement anyway.*" President Trump also tweeted that a secret meeting scheduled at Camp David with Taliban representatives and Afghan President Ashraf Ghani was also aborted.

Taliban, in an official statement, threatened that the suspension of talks could "hurt US".

Analysis

Despite the talks and the signing of agreements to reduce violence, the Afghan Taliban continued to intensify indiscriminate attacks. These attacks showed no sign of abating and peaked in August 2019, when a suicide bombing killed 63 people and left 180 injured. Although ISIS claimed the attack, the Taliban's complicity was not ruled out.

US Secretary of State Mike Pompeo blamed Taliban for the impasse, stating that the Taliban "*...tried to gain negotiating advantage by conducting terror attacks inside the country*". He also said that the Taliban backtracked on earlier promises like cutting ties with Al Qaeda.

The unexpected suspension of the talks has offered momentary relief to the majority of Afghans who lived in trepidation of the "Taliban era" – who did to support the withdrawal of US troops. "*There is definitely a silver lining to this,*" said Haroun Mir, an analyst based in Kabul. "*There was total confusion before. Everyone was afraid the U.S. would sign a cease-fire but the Taliban would continue their war against the Afghan government and people. Afghans feared that the withdrawal would lead to concessions to insurgents and re-imposing of stringent Islamic rules.*"

This impasse is also an opportunity for the government of Ashraf Ghani to stand up and be counted. The government spokesman Sediq Sediqqi noted that the Taliban must "*stop killing Afghans and agree to negotiate directly with the Afghan government. We have always been behind a meaningful peace process and we will always be the implementer of that process.*"

The Trump administration was working hard to finish the peace talks before September 28th elections in Afghanistan. While it is still unsure if the stalling of the peace process will affect the elections, Afghans have considered postponing the election dates. This is the fourth election since the Taliban was expelled from power after the 9/11 attacks.

Regional countries like Russia, Central Asian Republics and India would also be relieved with this move, as they considered exclusion of the Afghan government from the talks as a major concession to Taliban without taking into account the concerns of the Afghan people.

Assessment

- Contrary to popular expectations, the US Taliban talks did not significantly contribute to peace and reconciliation. For the common Afghan, there were hardly any peace dividends.
- In fact, the continuing violence was a cause for grave concern to the common man, in the vent that the Taliban faced no opposition from US and its NATO allies. Their disillusionment with the talks was palpable.
- Taliban attacks in cities, including the major one in Kunduz, were indicative of Taliban intransigence. Taliban has sensed an urgency in the US negotiators to seek early closure and feel emboldened to continue with their insurgency/ terror campaign. While parlaying with the Americans, they kept up the offensive against the Afghan government to weaken it and keep it destabilised.
- The strategy is clearly designed to minimise the waiting period for a Taliban takeover after the US departure.
- Even if the peace talks were successful, the partial restoration of an Islamic Emirate in Afghanistan means that it would create a magnet for global jihadists. This would create fresh security concerns for the regional countries although perhaps not immediately for the US.
- It is important not to underestimate the resolve of the Taliban leadership, and their powerful backers, who have fought long and hard to regain what they consider is rightfully theirs. Negotiation remains the best option to resolve this imbroglio and we believe that after some posturing, the talks would continue.

Integrating Indian defence forces



Can the appointment of a Chief of Defence Staff (CDS) kickstart the long due integration of Indian defence forces and create a multidimensional force at par with the modern militaries of the world?

Background

A military is only as good as the efficacy of its command and control structure, both in war and peace. Clausewitz's nine principles of warfare did not include the principle of 'jointness' which now has become a guiding principle in war for the leading militaries of the world. Those who ignore it, do so at their own peril.

The success in a modern war depends on the formulation of a joint military strategy based on the politico-military aim and its integrated execution. Under the current system that India inherited from the British, operational plans are individually drawn up by the three Services, based on the Defence Minister's Operational Directive. Limited coordination alone is carried out at the operational and the tactical level.

A definition coined at the Indian Defence Services Staff College explains Jointmanship as *"Integrated planning and application of military power at the Strategic, Operational and Tactical levels, with proper sequencing of combat power of the three Services in time and space as per requirement and in relation to the enemy's centres of gravity and culmination points, is a must to win a war"*.

In various ways, many observers advocate the hierarchy principle, which holds that the degree of jointness is inversely proportionate to the number of command echelons. Flatter organizations are more prone to effective internal cooperation. Therefore, if each of the individual services--Army, Navy and Airforce--is looking up a silo to their respective hierarchy to get operational/directives with no common ground in between, decisions taken may be disjointed, duplicated and even worse, would ignore the one cardinal principle: unity of effort.

The P5 of UNSC have long adopted the Integration of their Armed Forces. In the US, UK and France, creation of a CDS or its equivalent was a top-down political decision as mutual competition for scarce budgetary allocations failed to bring consensus between the Services. The pull of parochial interests was too strong. The US, UK, and France ultimately adopted the Joint/Integrated Command model for its armed forces, with some like US and China going down to the operational level to form joint theatre command structures.

Jointness/integration, or rather lack of it, was a bitter lesson of the Kargil War for India, and gave birth to the Kargil Review Committee Recommendations. The Ministry of Defence has made it their focus for the past few years. As a stopgap measure, and totally inadequate one at that, the Government set up the Headquarters, Integrated Defence Staff (HQIDS), headed by the Chief of

Integrated Staff to Chairman, Chiefs of Staff Committee (CISC), to support the existing (and largely ineffective) Chiefs of Staff Committee (COSC).

Pending for nearly two decades, Prime Minister Narendra Modi announced the creation of the office of the CDS in his Independence Day speech 2019, stating, *"To further sharpen coordination between the forces, India will have Chief of Defence Staff, CDS which will make the forces even more effective"*.

Analysis

India is the world's last democracy without a single-point military advisor like the CDS. It is the only major democracy where the Armed Forces Headquarters are external to the apex government structure as attached offices' rather than integrated departments. This model was put into action in 1947 by Louis Mountbatten's Chief of Staff, Lord Hastings Ismay.

This strange structure of three commanders-in-chief heading their respective services, with a central committee for coordination, though intended to be a temporary arrangement, has continued till date, with each service doing its own force and war planning. Consequently, the warfighting too is controlled and conducted in individual service specific battlespace with some degree of inter-services cooperation, overshadowed by a lot of turf protection and petty hiving of resources.

In the case of India, out of a total of 17 single service commands (Army, Navy and Airforce), only one is a truly tri-service command-Andaman and Nicobar Command. Strategic Forces Command (SFC) due to the peculiar nature of its operational role is also a 'purple' organisation directly under the National Command Authority. Similarly, the fledgling Cyber Command and the Special Operations Command would have to be joint command, as they come of age. Other Commands being examined are a Space Command, a Logistics Command and an Air Defence Command, all of which by virtue of their specific roles, will have to be integrated commands with a task-specific representation of each service.

The larger than life role of the Army and its share of the resources purely based on its size, made the other services wary of accepting a "Super Chief" who if not wearing the same shade of uniform was unlikely to do justice in the allocation of funds for future acquisitions and growth. It was preferable to plead one's case directly to the Ministry regardless of the cost involved to the national exchequer due to duplication, in the face of turf building and stove piping of expensive training and maintenance.

Since there is an existing integrated service organisation located in Delhi --Integrated HQs of Defence Staff (HQ IDS)--manned by the Chief of Integrated Defence Staff (CISC), currently a three-star officer, the first incumbent of the post of CDS can quickly get into the business of preparing for war in terms of common doctrines, policies and training objectives, force structures, amalgamating logistics resources and other assets. Service interests may be in conflict to joint interests and there is bound to be disharmony amongst stakeholders. Undoubtedly, the way forward is long and challenging.

Assessment

- The CDS, once appointed should not become a ceremonial post or one amongst equals. To be effective, he should enjoy a degree of control over the three services and should be constitutionally mandated as a single-point adviser to the National Command Authority on matters pertaining to defence.
- CDS should be actively involved in formalising modern force structures in consultation with the three services. His recommendations would receive due consideration as the single point of advice to the Government. He would also be responsible for producing the National Military Strategy and provide major inputs for the National Security Strategy.
- There is no doubt that waging modern wars will require theatre commands. The practical way to ensure proper command and control would be for the theatre commanders to report to the National Command Authority through the CDS. CDS by himself is not the panacea- if the system is to be successful in war the integration must seep down to the operational echelons through credible theatre commands, as being rapidly evolved and fine-tuned by China.

COLUMN: Rear View



TOBBY SIMON

Quantum computing: Race to the edge

While Moore's Law or the exponential growth of integrated circuits refers to the fifth paradigm of computation, quantum computers may well be the sixth paradigm, given that they work in a fashion that is entirely different from "classical" computers. Why is this technology key to data protection and research?

We are at the threshold of yet another generational shift in technology which has the potential to change the foundations of commerce, intelligence, military affairs and strategic balance of power. Since 2013, scientists have been working on processors using quantum physics for super positioning and entanglement that could process more values simultaneously.

While a classical computer performs operations using "bits"--0 or 1--a quantum computer uses "quantum bits," or "qubits". Thanks to quantum superposition, these qubits can have a value of "0," "1," or both "0 and 1" at the same time. This capability allows quantum computers to solve certain types of complex problems that are unsolvable for conventional computers.

The power of qubits is that they scale exponentially. A 2-qubit machine permits four calculations, a 3-qubit machine, eight calculations and a 4-qubit machine, 16 calculations, all simultaneously. At 300 qubits, a computer can do more calculations than there are atoms in the universe.

Quantum computing holds the key to future suzerainty over the cyber world, for the country that is able to grasp its complexities could pretty much become the apex power.

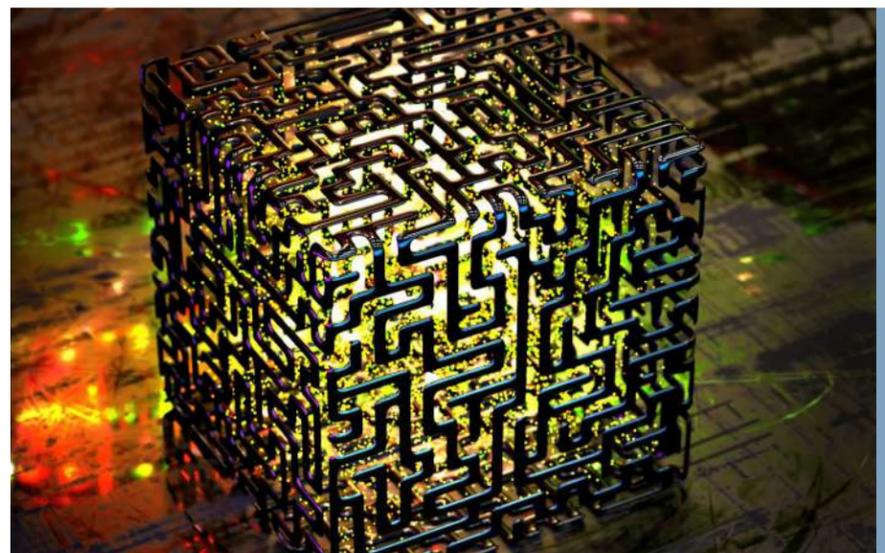
Chinese research institutions and US technology companies are in a race to develop quantum computers. China is at the forefront with initiatives such as quantum enabled Micius satellite and the establishment of a national network infrastructure. It is also building the world's largest and most advanced quantum research facility to develop "revolutionary" forms of technology that can be used by the military for cryptology, stealthy submarine navigation and "un-hackable" quantum computing.

While Chinese budget for quantum projects remains a closely guarded secret, the fact that they are opening a National Laboratory for Quantum Information Sciences in 2020 indicates that they are planning big.

US too has been spending billions on this cutting-edge technology and is naturally worried. Congressman Will Hurd, known for his computer science degree and career at the CIA, underlined US concerns when he said, "The impact of quantum on our national defence will be tremendous. The question is whether the United States and its allies will be ready."

In an attempt to drive America's return to high-performance computing supremacy, the US decided that it would build an exascale computer, 30 times more powerful than the Chinese Tianhe-2, by 2020. The challenge is that it would cost a billion dollars and will require a nuclear power plant to run the supercomputer. These machines have a 5-qubit processor. A single chip with about 50 to 60 qubits would be more powerful than the entire Tianhe-2, machine the size of half-a-football-field.

US companies like Microsoft and Google have set up dedicated quantum computing initiatives. There was an internet leak, perhaps inadvertently, which said that physicists at Google have used a quantum computer to perform a calculation that



would overwhelm the world's best conventional supercomputer. This milestone is being called "quantum supremacy." As things stand, the odds of winning the race are skewed in favour of China. Not only has it taken an early lead, its campaign is more focussed, better organised and well financed. The US appears to be trailing because of budget cuts and loss of focus. Although many companies in the US are independently pursuing research on quantum computing, their priorities and incentives do not align with those of US government and military. Whereas in China, the State, military, academia and private industry are in lockstep.

Quantum computing will revolutionise business in many fields. Financial service providers acknowledge its ability to enable new application options, from portfolio optimisation to fraud detection and new payment systems to high-frequency trading. On the flip side, quantum computing will penetrate the most secure encryption codes rendering them defenceless in a flash. An organisation or a nation that has quantum computer technologies would have a significantly easier time of wreaking havoc on other systems.

Toby Simon is the founder and president of Synergia Foundation, and serves as a commissioner on the Global Commission on Internet Governance.

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