

Raksha ANIRVEDA

PURSuing SELF RELIANCE IN DEFENCE



**RE-IMAGINING
MAKE IN INDIA**



**The Right
Time to Make
Mission Critical
a Success**

**Chief of Defence
Staff – Boon or Bane**

The momentous announcement from the rampart of Red Fort

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-Editor

RESPONSE

'Raksha Anirveda' editorial team looks forward to receive comments and views from the readers on the content of the magazine.

Editorial

AIMING HIGHER, LET'S KEEP THE MOMENTUM GOING



The call for New India, Strong India made by Modi 2.0 government is taking centre stage with government's renewed focus on strategic and defence affairs showing

positive trends. Despite rise of unilateralism and steady decline of multilateralism, India has not only held its own on matters of crucial national interest, but shown to the world of the pivotal role it's going to play in the future global order. In a fine balancing act, the government has redefined foreign and strategic policy keeping the core foundation intact with a new idiom and forging new, fresh engagements with all the major powers - Russia, USA, France and others on the high table. It has been deft, nuanced and jugular maintaining a fine balance.

The government's move to nullify Art 370 was a master stroke. It not only isolated Pakistan on the issue of Kashmir globally but also forced it to flounder repeatedly despite its aggressive posture and stepped up information warfare. However, despite Pakistan's failure to mobilise international opinion in its favour there is still need to exercise caution on this as lockdown in Kashmir continues. It could be a tough road ahead for the government and it will have to tread a rather sensitive path adopting a pragmatic, practical and energetic approach that's ahead of the curve.

The government has been increasingly focussed on enhancing the Defence capability. The Prime Minister announcing in his Independence Day address the setting up of Chief of Defence Staff - CDS which though late, is a positive move. However, only time will tell whether CDS has the mandate to fulfil its objective in real terms or not. Taking

into account the security challenges arising out of neighbourhood geopolitics, the government has been on a massive procurement spree for the defence forces, it has also been focussing on self-reliance in defence manufacturing under the "Make in India" programme. The success of iDEX has emphasised that its replication and expansion of scale is important to energise the domestic defence industry ecosystem. It's expected that the upcoming DefExpo 2020 will provide the much needed momentum to indigenisation.

Recent developments in the Strategic Partnership (SP) policy has brought to the forefront its inherent flaws that demands immediate fixation to ensure that there is Transfer of Technology in real terms and it doesn't meet a dead end. Further, it's important to unleash the much needed reforms in DPSUs, R&D institutions and put in motion the level playing field for competitive market play between public and private enterprises. A recent seminar organised by Indian Telecommunications Equipment manufacturers was indeed revealing since it showed that the procurement policy doesn't clearly define and differentiate between an assembler and manufacturer and considers both at par. A lapse that has impacted the innovative growth of SMEs and MSMEs and will have far reaching implications in future as well towards the realisation of self-reliance goal in defence manufacturing.

Raksha Anirveda congratulates IAF on its 87th anniversary and wishes them the best with confidence that they will continue making the difference through innovation and ensuring maximum effectiveness.

Jai Hind!!

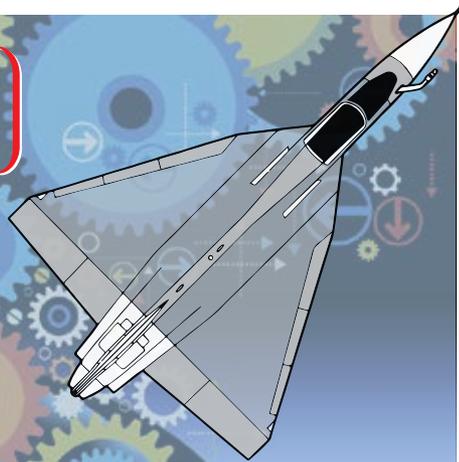
Ajit Kumar Thakur
Editor & Business Director

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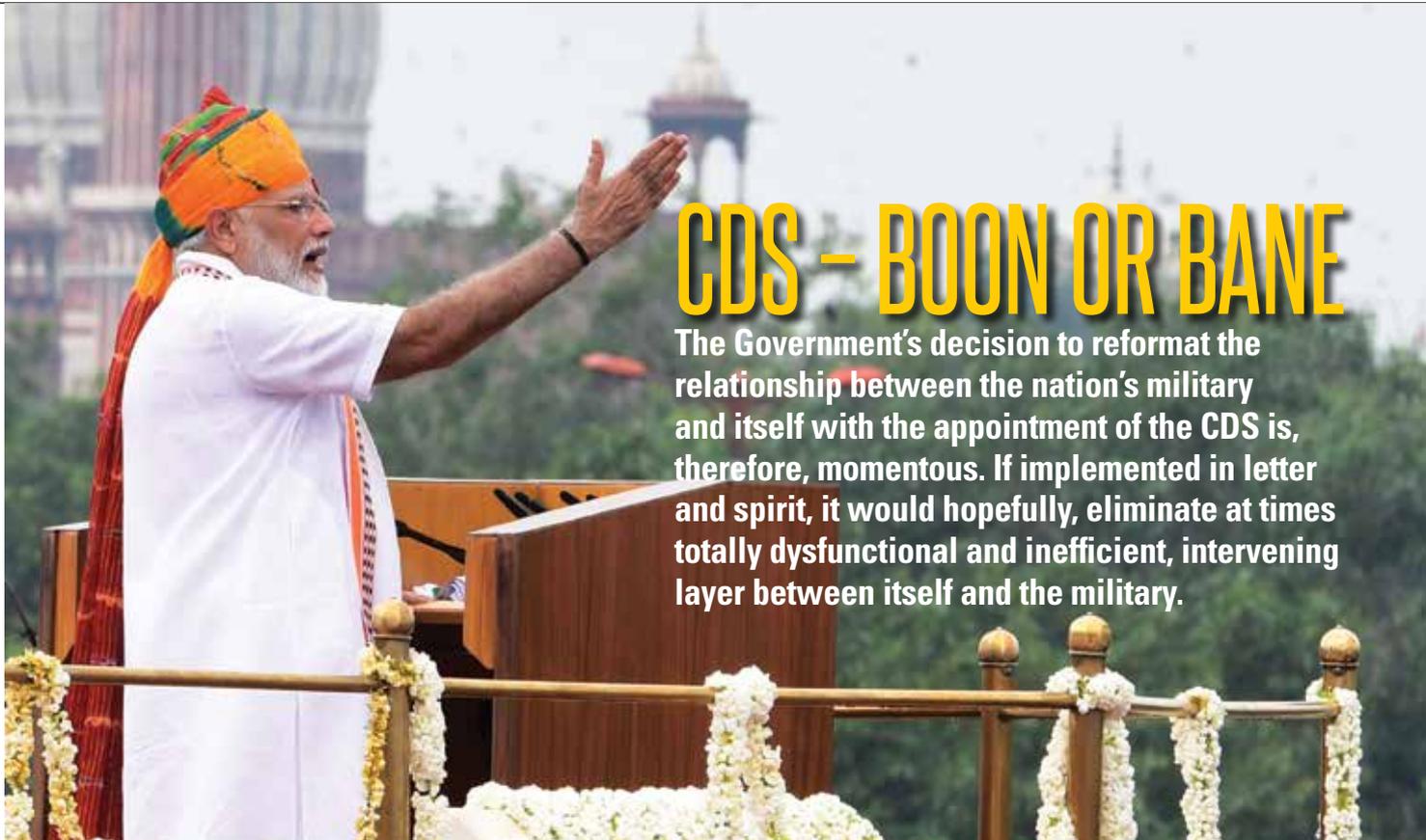
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CDS – BOON OR BANE

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“The Armed Forces are not like a limited liability company to be reconstructed from time to time as the money fluctuates. It is not an inanimate thing like a house to be pulled down or enlarged or structurally altered at the caprice of the tenant or owner. It is a living thing. If it is bullied, it sulks; if it is unhappy, it pines; if it is harried, it gets feverish; if it is sufficiently disturbed, it will wither and almost die, and when it comes to this last condition, it is only revived by lots of time and lots of money.”

Sir Winston Churchill

By **AIR MARSHAL DHIRAJ KUKREJA (RETD)**



LONG AWAITED ANNOUNCEMENT: Prime Minister Narendra Modi’s announcement of appointing a Chief of Defence Staff (CDS) from the ramparts of the Red Fort in New Delhi on August 15 (Independence Day), was a much awaited and desired news specially among the serving personnel as well as veterans and giving further impetus to the social and visual media which was already abuzz with the news and comments. The much-delayed, and in some quarters, also much-awaited and much-desired announcement was indeed welcome news. The announcement on the country’s Independence Day speech holds special significance, just as the “Swachh Bharat Abhiyaan” announced a few years ago became a national movement. Hopefully, this appointment too will be a ‘mover and shaker’ in the nation’s higher defence management structure.

Though to the general populace, the announcement may not hold much importance, but it does to the country’s Armed Forces, both serving and the veterans. While those who are still in uniform may not be able to air their views, both approving and disapproving, in public, the veterans took to social media like a bee to honey, airing their views as if one of the veterans would be holding that appointment. Nevertheless, it becomes imperative to make people aware of its significance and the background of the announcement and the reasons why it has caused excitement amongst the servicemen and the ex-servicemen.

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IN FOCUS

IN FUTURE WARS OR WAR-LIKE SCENARIOS, POLITICO-DIPLOMATIC FACTORS WILL PLAY A DOMINANT ROLE, HENCE REQUIRING A CAREFUL AND CALIBRATED AMALGAMATION OF MILITARY OPERATIONS, DIPLOMACY, AND DOMESTIC AND INTERNATIONAL POLITICAL ENVIRONMENT, FOR A SUCCESSFUL OUTCOME

Even though it may have created an euphoria but the exercise is yet to begin and considering the numerous hurdles specially of the bureaucratic kind, it is not going to be an easy exercise before the appointment of a CDS takes shape.

CDS IS NEED OF THE HOUR?

One of the essential ingredients of exerting influence is a well thought out military strategy and a viable military capability to execute it. The very fact that such a capability exists with a nation, is more often than not, an adequate guarantee that it would not be required to be

used. After all, this is the essence of deterrence. Unfortunately, on both these counts, i.e., a well thought out military strategy and a viable military capability, the Indian leadership has been lacking the will to develop a comprehensive system. It is only now, in the last five to six years, that some noises have begun to be made to strengthen both these capabilities.

India's national security decision-making processes have been neglected for the last about seven decades. No effective and institutionalized structures and mechanisms catering to its unique security needs have been designed in spite of four, or rather five wars with China and

Pakistan and a continuing proxy war sponsored by Pakistan. The reason for this continued neglect has been mainly political, prompted by a lack of understanding of the working of the military and some misplaced bureaucratic inputs, though the military too is not fully absolved of the blame.

During India's struggle for independence, the freedom-fighters had whole-heartedly applied themselves to the task in hand of gaining independence and had devoted little time to the issues of defence. As independence was slowly becoming a reality, in their collective wisdom, the political leaders at the helm were fairly convinced that a non-violent India with no hegemonic ambitions would be free of external threats. Pakistan was not considered then. It was also argued that the major world powers, tired after an exhausting World War II, would not engage India militarily, should they feel that the country was tending to go astray. Thus, on August 15, 1947, the country gained independence without having given a serious thought to a defence policy. "A Tryst With Destiny," as Nehru- the first Prime Minister- had proclaimed for the country, on unfurling the tri-colour, had actually begun for the Indian Armed Forces.

The Commander-in-Chief (C-in-C) in pre-independent India was second only to the Viceroy. Being the member of the Viceroy's Executive Council, he was thus the de-facto Defence Minister. Soon after independence, the War Department and Defence Department were merged to form the Ministry of Defence (MoD). It was enlarged to take on additional roles of



(Top) Indian Army jawans during India-China 1962 war; then Prime Minister Jawarlal Nehru meeting soldiers

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Prime Minister Narendra Modi, Defence Minister Rajnath Singh and Home Minister Amit Shah attending a Cabinet meeting

defence management, namely, threat assessment, force levels, budgeting, and defence production. Independence of the country necessitated creation of structures different from those existing under the British rule to establish parliamentary control over the military, with internal formations and arrangements, which were designed mainly to quell the fears of many a leader, on the political ambitions of the military. In 1947, a committee of three senior Indian Civil Service (ICS) officers suggested a restructuring of the new MoD. They aimed to lower the status of the military in relation to the ICS on the same lines as had been done for the police (this practice has been continuing since then, year after year). Ironically, it was Lord Mountbatten, the

last Viceroy of India, who ensured that the Service Chiefs maintained their status over the Defence Secretary.

Lord Ismay, the then Chief of Staff and working with Lord Mountbatten, was tasked by the Prime Minister to draw up a higher defence organization for India. Prevailing conditions did not permit large-scale changes, but a number of committees were recommended for coordinated decision making for national defence. In essence, independent inputs were to be forwarded by the Chiefs of Staff Committee (COSC), the Defence Minister's Committee (DMC), of which the Service Chiefs were members, and the Defence Committee of the Cabinet (DCC), signifying the representation of the Armed Forces, as also

the bureaucracy and political control. Over a period of time, once Krishna Menon became Defence Minister, the latter two committees degenerated into ad hoc procedures, in the process marginalising the Service Chiefs. Their repeated reduction in precedence further reduced their role in the decision making process.

The Sino-Indian War of 1962, followed by the Indo-Pak War of 1965, did bring about some cosmetic changes, but these were short-lived; the reluctant approach of the Indian political leadership towards military matters and the resultant neglect, was the unfounded continuing suspicion of any lurking political aims of the Armed Forces. In 1971, the Cabinet Committee on Political Affairs (CCPA) replaced



the Emergency Committee set up in 1962, which earlier had been set up as a replacement to the DCC. The CCPA had a broad charter and was not as exclusive as the DCC, where only defence related matters were discussed and the attendance of the Service Chiefs was mandatory. This was not so for the CCPA meetings. The transferring of the Military Wing from the Cabinet Secretariat, to the MoD, further compounded the break. The Military Wing previously provided secretarial support to the DCC and COSC. With the transfer, the Defence Secretary started considering all COSC matters. The Higher Defence Control mechanism, which, thus came into place was unique and bizarre and still continues. The MoD is manned almost entirely

by non-uniformed generalists, who consider themselves to be experts, and are hence the final arbiters of all military proposals, starting from procurements to promotions and placements. Some changes have occurred, first, with the creation of the Headquarters Integrated Defence Staff (IDS) in 2001-02, on the recommendation of the Kargil Review Committee (KRC), and as noted earlier, in the last half a decade or so, under the new political dispensation.

NEED TO MODIFY THE ARCHAIC DECISION MAKING PROCESS

A direction in higher-defence policy formulation is strictly the prerogative of the political leadership, as it should be in

any democratic country. This fundamental principle has been scrupulously followed by our apolitical Armed Forces, unlike the examples of Pakistan, Myanmar, and Bangladesh in our immediate neighbourhood. Unfortunately, either intentionally or through ignorance, the interpretation of civilian control has been misunderstood as bureaucratic rather than political, with the bureaucracy playing the highly effective card of 'divide and rule' to perfection. The Service Headquarters have been kept outside the framework of higher defence decision-making for these years, leading a prominent journalist Shekhar Gupta - former editor of Indian Express and now a prominent columnist - to comment, "*In no other major democracy are the armed forces given so insignificant a role in policy making as in India. In no other country do they accept it with the docility they do in India.*" (As quoted in Jaswant Singh's book, '*Defending India*')

The current functioning in the Government, if indicated as a flow chart, would appear as a tall chimney where information and decisions flow vertically, a step at a time for seven steps before a decision reaches at the level of the Minister, with absolutely no lateral connection between departments or other ministries. To respond to a query from the highest level, the process would have to work in reverse before the staff can provide an answer. In the Information Age, there is a need to modify such an archaic decision-making process and make it more flexible and amenable to adjustments and above all to hasten the process of decision making. Inter- and intra-departmental and ministerial grids need to be

IN A SIGNIFICANT DEFENCE POLICY REFORM NOTIFIED ON APRIL 18, 2018, THE GOVERNMENT REVAMPED THE EXISTING DEFENCE PLANNING SYSTEM WITH THE ESTABLISHMENT OF A DEFENCE PLANNING COMMITTEE (DPC), ONCE AGAIN, UNDER THE CHAIRMANSHIP OF THE NSA

linked horizontally at various levels, to provide synchronism that can hasten the decision-making process.

While too little control over the armed forces can lead to serious problems, too much control can smother the military and render it ineffective in the long run. Fortunately, except for the debacle of the Sino-Indian War of 1962, India has managed rather well through the various military conflicts. However, each conflict did leave behind unmistakable signs of inadequacy in the existing systems. While one does agree that the Service Headquarters are consulted on security issues, but it is no substitute for inclusion in policy-making. The MoD asks the Service Headquarters, individually or jointly, or through the Chiefs of Staff Committee (COSC), for opinions on issues, be they operational, intelligence, administrative matters, or relating to personnel, and thereafter it deliberates on them, with little or no competence to analyse such issues. There exists no methodology for any joint analysis of issues, unless dictated by the political leadership.

The Cabinet Committee on Security (CCS) is the highest policy formulation body in the country on security issues. It gets its inputs from varied sources, including the Service Headquarters, which is channelled through MoD. Service Chiefs are not members of the CCS, but may be invited for consultations, just as many others. A National Security Council (NSC) and the office of a National Security Advisor (NSA) were created in 1998. The Services are represented in the NSC by a single officer as the Military Advisor. The National Security Advisory Board (NSAB), also formed in 1998, consists of several domain

experts, and has been recently reconstituted with two military experts in varied spheres. The NSC has a sub-group, the Strategic Policy Group, which is the nucleus of the decision-making apparatus. Its members include a host of senior or secretary level officers from various government departments, including the three Chiefs of Staff and the NSA has recently been appointed as its chairman.

successful outcome. Monitoring the escalation would require closer political oversight and high levels of politico-civil-military interaction. With conflicts becoming multi-dimensional, the armed forces require geo-strategic awareness and specialised political guidance, without the interference of generalised bureaucrats. It, therefore, is imperative to reorganise the networking



Former Defence Minister Nirmala Sitharaman addressing the media

FUTURE NEEDS – HIGH LEVELS OF POLITICO-CIVIL-MILITARY INTERACTION

Political neglect has degenerated into bureaucratic control over the Armed Forces, thus, quite naturally, having an adverse impact on the state of preparedness for war, the modernisation hype apart. In future wars or war-like scenarios, politico-diplomatic factors will play a dominant role, hence requiring a careful and calibrated amalgamation of military operations, diplomacy, and domestic and international political environment, for a

system of the armed forces within, and with other government and non-government agencies that have an important role to play in a future war.

Attempts have been made to transform the defence structure, ever since independence but these have been only 'baby steps', with no real success. After the Kargil Conflict in 1999, a comprehensive review was conducted, only to be left mid-way during implementation. While the IDS Headquarters was established in 2001-02, it has remained without a head ever since. The appointment of a CDS was further pushed into uncertainty with yet another committee

appointed by the Government in 2011 with the chairmanship of the committee entrusted to Naresh Chandra (now deceased), an accomplished bureaucrat, who was ably assisted by other bureaucrats and former Chiefs of the three Services. The recommendations were similar to those made in 1999, except that the CDS was replaced with a permanent Chairman of the existing COSC. The difference between a CDS and a permanent Chairman needs understanding. While both would be able to provide single-point advice on military and security issues to the Government to better coordinate the modernisation plans of the three Services through the existing Headquarters, the operational requirement for joint warfare would fall short by not appointing a CDS; a permanent Chairman would, in all likelihood, not be able to integrate operational plans.

In a significant defence policy reform notified on April 18, 2018, the Government revamped the existing defence planning system with the establishment of a Defence Planning Committee (DPC), once again, under the chairmanship of the NSA. This new institutional mechanism, set up as a permanent body, is intended to “facilitate a comprehensive and integrated planning for defence matters” – a vital ingredient in defence preparedness, which was conspicuously missing in the mechanism set up in the early 2000s in the wake of the Kargil conflict. The new measure, arguably the boldest defence reform in decades, is expected to have extensive result on the process of defence planning and, hence, on defence preparedness.

The need for a single-point adviser between the Government

and the Armed Forces is an essential pre-requisite in this age of fast-flowing information. It has been a long-standing recommendation by a succession of committees since the KRC in 1999 and a Committee of Experts set up by the MoD in 2016, under the chairmanship of Lt General DB Shekatkar, all of which have asked for structural reforms in the military and an integrated command structure. The idea has been to create an office that would bring unity of command to the Services with a high-ranking military official who would rise above inter-services rivalry and provide single-point advice to the political executive on critical issues such as joint operational strategy and planning, weapons procurement, and manpower allocation.

To be fair, there never really has been any consensus in the defence establishment too, on the prudence of such a move, with the bureaucracy playing its cards well to further the divide. In addition, fearing a loss of its domination over the Armed Forces, the bureaucracy has preyed on the baseless fears of the political class, leading the latter to believe that a powerful military officer at the apex could encourage praetorian tendencies in the Armed Forces, as in our neighbours. Meanwhile, concerns that the new office would be dominated by the Army have never quite allowed the Navy and Air Force to fully support a CDS. Under some pretext or the other, either of a unified command structure through the setting up of theatre commands or the apprehension of the respective Chiefs of losing their importance, the two Services have played down the demand of a CDS.

The Government’s decision to reformat the relationship

INDIA'S NATIONAL SECURITY DECISION-MAKING PROCESSES HAVE BEEN NEGLECTED FOR THE LAST ABOUT SEVEN DECADES. NO EFFECTIVE AND INSTITUTIONALIZED STRUCTURES AND MECHANISMS CATERING TO ITS UNIQUE SECURITY NEEDS HAVE BEEN DESIGNED IN SPITE OF FOUR, OR RATHER FIVE WARS WITH CHINA AND PAKISTAN AND A CONTINUING PROXY WAR SPONSORED BY PAKISTAN. THE REASON FOR THIS CONTINUED NEGLECT HAS BEEN MAINLY POLITICAL, PROMPTED BY A LACK OF UNDERSTANDING OF THE WORKING OF THE MILITARY AND SOME MISPLACED BUREAUCRATIC INPUTS, THOUGH THE MILITARY TOO IS NOT FULLY ABSOLVED OF THE BLAME.

between the nation’s military and itself with the appointment of the CDS is, therefore, momentous. If implemented in letter and spirit, it would hopefully, eliminate at times totally dysfunctional and inefficient, intervening layer between itself and the military. With all candidness, the task ahead for the Government is not going to be as easy as it appears. The opposition to the appointment of the CDS has had its way for the last two decades to keep the military under its control, as also to keep the decision pending.

Even as the euphoria continues, there is a need to recognise that the task is far from complete, in fact, it is yet to begin. How effective the CDS would be depends on the mandate given to him, the swiftness of establishing his appointment, and how quickly the reforms are undertaken, which would include changing the MoD architecture too. The die-hard critics need to realise that the aim of the transformation is not to step on others toes but to provide an impetus to the entire decision making process. It would be in our national interest that this realisation comes sooner than later or worse, never at all. The task ahead is huge. Whether the CDS would be a boon or a bane, only time can tell! ■

–The writer is an IAF veteran

ARMY REFORMS: TRAINING, ACQUISITION AND MODERNISATION

Like the United States and China where revolutionary changes in military brought in through implementing some rules, Prime Minister Narendra Modi must take on this mantle, leaving ceremonials to the President as Supreme Commander. For this, a CDS with full operational powers over the military in order to be effective is required. The CDS being principal military adviser and directly under Defence Minister, must also have direct access to the Prime Minister

By **LT GEN PRAKASH CHAND KATOCH (RETD)**





CAG office building in New Delhi

ARMY REFORMS MUST MAXIMISE ITS COMBAT POTENTIAL TO MEET CURRENT AND FUTURE NEEDS OF 21ST CENTURY BATTLEFIELD. CONSTANTLY ENGAGED IN ACTIVE OPERATIONS (CONVENTIONAL AND SUB-CONVENTIONAL), INDIAN ARMY HAS DISPLAYED HIGH PROFESSIONALISM. BESIDES, HOLISTIC TRI-SERVICE REFORMS ARE REQUIRED BASED ON NATIONAL SECURITY STRATEGY (NSS) AND STRATEGIC DEFENCE REVIEW (SDR), WHICH IRONICALLY IS YET TO BE DEFINED

A

Army reforms must maximise its combat potential to meet current and future needs of 21st century battlefield. Constantly engaged in active operations (conventional and sub-conventional), Indian Army has displayed high professionalism. But no service can fight wars individually and succeed. Holistic tri-Service reforms are required based on national security strategy (NSS) and strategic defence review (SDR), which ironically are yet to be defined. Military jointmanship remains a casualty. Prime Minister Narendra Modi has announced India will have a Chief of Defence Staff (CDS), but latter's role, power and access to Prime Minister will determine extent to which he can synergise and reform our military.

Our military's combat potential has been affected due to lack of vision by governments, military as "attached offices" kept away from strategic security formulation, defence ministry sans military professionals, inadequate budgets, gigantic governmental defence-industry with poor yet costly products, and antiquated procurement procedures. Government recently approved restructuring of Army HQ, which includes setting up separate mechanisms for 'human rights' and 'discipline and vigilance', as also moving more than 200 officers from Army HQ to field. More significant is the Army reorganising into integrated battle groups (IBGs), replacing Brigades. IBGs with offensive roles will execute cross-border operations during hostilities, while those with defensive roles will hold defence like Brigades.

IBGs will have elements of warfare like artillery guns, tanks/ICVs, air defence and logistics integral to it, ensuring better integration, self-sufficiency and mobility, unlike the brigade which on outbreak of hostilities must wait to be augmented by artillery, air defence, logistics etc. IBG with offensive role will have higher quantum of mechanised elements providing ensure more power and manoeuvrability; such IBGs relate to Army's Strike Corps. IBGs with defensive roles would have higher number of infantry and troops for holding ground; such IBGs relate to the "Pivot Corps", tasked for holding role with lesser mechanised elements. The IBG concept has been successfully tested in the plains and semi-desert sectors. A Joint Army-Air Force Exercise 'Him Vijay' involving some 15,000 troops is scheduled to be held in Arunachal



2019, which saw participation by Army, Navy, Air Force, National Security Council Secretariat (NSCS), National Technical Research Organisation (NTRON), Indian Computer Emergency Response Team (CERT-in), Defence Research and Development Organisation (DRDO), National Informatics Centre (NIC), CSRC, academia and industry. Subsequently, on July 25-26 this year, a space war exercise 'IndSpaceEx' was conducted under the aegis of HQ Integrated Defence Staff (IDS) with all military and scientific stakeholders. The exercise was in backdrop of China's rapid strides in space including formidable line up of Anti-Satellite (ASAT)

pro-active approach, rather than being largely in 'rebuttal' mode. Such synergy, joint training and dynamic execution are warranted to speed up normalisation in Jammu and Kashmir (J&K) and states afflicted by radicalisation.

In November 2018, media reported that Army plans to reduce its manpower by some 1,50,000, including about 4,000 officer, over the next five years as part of restructuring. However, it we must acknowledge that force structures are based not only on threats, challenges and changing regional/global security environment, but also national aspirations. In latter context, Government is aspiring to integrate Pakistan occupied J&K (PoJK) and the Army Chief has stated that the Army is ready. But unlike liberating Bangladesh and withdrawing, integrating PoJK implies capturing, holding it permanently and administration. By no stretch of imagination, China will remain dormant. Has the exercise to reduce the Army by some 1,50,000 been done in vacuum, without considering this national aspiration? Has integration of PoJK been war-gamed at tri-service and national levels: overall wherewithal required matching envisaged duration of operations; back up; administering-cum-defending captured areas, and; cost of the campaign?



(Top) Indian Army jawans in action with Ultra Light Howitzer (ULH); Army needs modernisation desperately

Pradesh in October to test three IBGs of the 17 Corps to exercise actual war scenarios. 17 Corps was raised as the Mountain Strike Corps but its raising beyond one Division was shelved due to paucity of funds.

In terms of training, the Directorate of Indian Defence University organised a Cyber Exercise on Scenario Building & Response on April 29-30,

weaponry including kinetic weapons like co-orbital killer satellites and direct ascent missiles as well as non-kinetic ones like lasers and electromagnetic pulse weapons. More training is required in these spheres. Government also needs to integrate the military into combating 'Narrative Warfare' (NW) or psychological slugfest with Pakistan for a coordinated

Modernisation of the Armed Forces has suffered with successive poor defence budgets, sometimes as low as in 1962. At times, Army had to shut programmes that were ongoing for several years due to shortage of funds. In January 2019, Parliament's Standing Committee on Defence criticised Government for inadequate allocation of budget to the Army that didn't meet funds required to meet



Indian Army Main Battle Tank

increasing threat perception and modernisation to face a two-front war, and allocation under capital budget for 2018-2019 didn't even fulfill MoD's committed liabilities, leading to litigation and additional interest burden. It pointed out that shortfall in funds provides no scope for modernisation. We lack holistic approach towards saving funds. A civilian-defence employee costs five times more than the civilian counterpart on an average. Savings planned through cadre restructuring by Army will be more than offset by ongoing expansion and upgradation of the civilian-defence cadre. India is yet to find the balance between economy and security, which requires defence allocation of at least 2.5 per cent of GDP.

Acquisitions are in absence of NSS and SDR, and troubled by red-tape. Recall former President Pranab Mukherjee publicly stating in November 2018 that bureaucracy is biggest obstacle to India's development. Earlier, Subhash Bhamre, then MoS (Defence) had briefed PM Modi that entire acquisition process

was badly broken and beset with huge delays, dogged by multiple and diffused structures with no single point accountability, duplication of processes, avoidable redundant layers doing the same thing again and again, delayed execution, no real-time monitoring and no project-based approach and tendency to find faults, as a consequence of which the 'Make in India' project was floundering.

Comptroller and Auditor General of India (CAG) has repeatedly pointed out that governmental defence-industry is mired in corruption, offering sub-standard products to the military at prices higher than what is available commercially-available-off-the-shelf (COTS). The 'deep state' has ensured that privatisation of defence-industry is in name only. Recently Government has shown intent to corporatise the Ordnance Factory Board. However, despite three earlier committees (2000, 2004 and 2015) recommending same, another committee has been ordered to study the issue. The hindrance will be three workers unions aligned with different political parties, who have got used

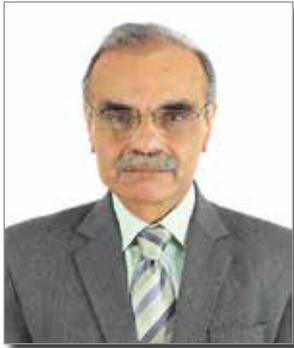
to easy money, corrupt practices and no accountability; which will be unacceptable in private sector. The work force make sizeable vote bank and with economy not doing too well, it will be interesting to watch whether Government makes only cosmetic moves changes or go for full hog corporatisation.

Need of the hour is a holistic revolution in military affairs. The Goldwater Nichols Act brought revolutionary changes in the US military. In China the change was ushered by Jiang Zemin with implementation overseen by the CMC and CGS PLA. President Xi Jinping presently is also Commander-in-Chief of PLA. Prime Minister Narendra Modi must take on this mantle, leaving ceremonial to the President as Supreme Commander. For this, a CDS with full operational powers over the military in order to be effective is required. The CDS being principal military adviser and directly under Defence Minister, must also have direct access to the Prime Minister. ■

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GOVERNMENT RECENTLY APPROVED RESTRUCTURING OF ARMY HQ, WHICH INCLUDES SETTING UP SEPARATE MECHANISMS FOR 'HUMAN RIGHTS' AND 'DISCIPLINE AND VIGILANCE', AS ALSO MOVING MORE THAN 200 OFFICERS FROM ARMY HQ TO FIELD. MORE SIGNIFICANT IS THE ARMY REORGANISING INTO INTEGRATED BATTLE GROUPS (IBGS), REPLACING BRIGADES

FINANCE COMMISSION TO LOOK INTO THE PROBLEM OF DEFENCE FUNDING



AMIT COWSHISH

In July this year, The Government asked the Fifteenth Finance Commission under the chairmanship of former bureaucrat N K Singh to explore the possibility of allocating 'adequate, secure and non-lapsable' funds for defence and internal security and also to examine whether a separate mechanism could be created for the purpose

Taking note of the persistent underfunding of defence, the union cabinet decided to tread a new path in a bid to resolve the problem. In July this year, it asked the Fifteenth Finance Commission to explore the possibility of allocating 'adequate, secure and non-lapsable' funds for defence and internal security and also to examine whether a separate mechanism could be created for the purpose. The term of the commission has been extended till November 30, 2019 to enable it to look into these – and other - issues and submit its recommendations.

The Constitution of India envisages Finance Commissions to be set up both at the centre and in the states. The Fifteenth Finance Commission is the central commission set up by the President in pursuance of article 280 of the Constitution, which requires it to make recommendations as to:

(a) The distribution between the Union and the States of the net proceeds of taxes which are to be, or may be, divided between them and the allocation between the States of the respective shares

of such proceeds;

(b) The principles which should govern the grants-in-aid of the revenues of the States out of the Consolidated Fund of India;

(c) The measures needed to augment the Consolidated Fund of a State to supplement the resources of the Panchayats in the State on the basis of the recommendations made by the Finance Commission of the State;

(d) The measures needed to augment the Consolidated Fund of a State to supplement the resources of the Municipalities in the State on the basis of the recommendations made by the Finance Commission of the State;

(e) Any other matter referred to the commission by the President in the interests of sound finance

Considering the constitutional remit of the finance commission, it is a bit surprising that the issue concerning inadequate funding of defence and internal security has been referred to it. It clearly does not fit into any of the first four clauses mentioned above. At best, it can be argued that the

reference has been made under the last clause of Article 280, assuming that resolving the issue of underfunding is in the 'interest of sound finance'. Be that as it may, considering that the root cause of the problem is already known and the options for resolving it are rather limited, it would be interesting to see what solution the Fifteenth Finance Commission come up with.

The root cause of the problem is very clear. In one word, it is about inadequacy of financial resources of the union government. It is undeniable that every year the funds allocated for defence are much lower than the demand projected by the armed forces. (In all probability, this will also true of the internal security.) But, contrary to the perception that many have, this mismatch is not on account of lower priority accorded to defence and internal security by successive governments, political indifference or bureaucratic machinations. The simple truth is that the government is unable to generate adequate revenue to be able to

THE REQUIREMENT OF FUNDS FOR ARMED FORCES IN FY 2018-19 ALONE, THE GAP BETWEEN THE DEMAND PROJECTED BY THEM AND THE ACTUAL ALLOCATION WAS APPROXIMATELY RS 1.12 LAKH CRORE

meet the demand of the armed forces in full, as indeed of other sectors like agriculture, health, education, infrastructure and internal security.

The requirement of funds for the armed forces is substantial. In FY 2018-19 alone, the gap between the demand projected by them and the actual allocation was approximately Rs 1.12 lakh crore, not to speak of the shortfall in the allocation made to other organisations such as the Defence Research and Development Organisation (DRDO), Border Roads and the Coast Guard. Even if the Fifteenth Finance Commission is not required to look into the requirement of these organisations (notwithstanding the fact that at least Coast Guard also plays an important role in country's security), it would still need to club the requirement of internal security organisations with that of defence to determine the overall magnitude of the requirement and recommend suitable measures for resolving the problem. By any stretch of imagination, the magnitude of the problem would be enormous.

At this stage, the choices before the commission appear to be broadly limited to four measures. The first option would be to recommend lowering of the share of the states in the tax revenue of the union, which was raised to 42 per cent on the recommendation of the Fourteenth Finance Commission. But, for obvious reasons, it would be naïve to expect such a recommendation to be made or, if made, to be accepted by the states.

The second option would be



A MORE VIABLE MEASURE TO RAISE REVENUES SPECIFICALLY FOR DEFENCE AND INTERNAL SECURITY WOULD BE TO LEVY A CESS ON INCOME/CORPORATE TAX. EVEN THIS MAY NOT GO DOWN WELL WITH THE INDIAN TAXPAYERS, BUT IT WOULD NOT BE A SUBSTANTIAL BURDEN ON THEM

to recommend measures to increase revenues of the union so that more funds could be allocated for defence and internal security or to generate revenue specifically for this purpose. Generally speaking, this can be done through taxation, borrowing or disinvestment. The option of raising revenues through taxation seems unworkable as there are severe limitations on raising the tax rates or expanding the tax base. At any rate, as any increase in the tax revenues would flow into the divisible pool of funds, it would not only get divided between the Centre and the states but

also be susceptible to pressure from other sectors crying out for higher allocations.

As for borrowing, the country has been struggling to meet the fiscal and revenue deficit targets mandated by the Fiscal Responsibility and Budget Management Act, 2003. Therefore, borrowing – and it will have to be on a recurring basis as the problem is not limited to

meeting a one-time requirement of defence and internal security – is not a viable option, especially since it inevitably increases the government's liability for payment of interest, requiring it to dip deeper into the revenue receipts. As for disinvestment, it cannot also be a recurring source of funding for defence and internal security.

The third option would be to recommend raising of revenues specifically for defence and internal security. This can be done by floating defence bonds and/or levying a defence cess on income/corporate tax. Since floating of bonds would also add to the liability of the government (on account of payment of interest and redemption), the commission may not consider it advisable to recommend this measure.

A more viable measure to raise revenues specifically for defence and internal security would be to levy a cess on income/corporate tax. Even this may not go down well with the Indian taxpayers, but it would not be a substantial burden on them and, therefore, it may be more acceptable than a general increase in the tax rates. The revenues generated through

cess may not be divisible between the Centre and the states and could be used specifically for the purpose for which the cess is levied.

The finance commission would have to depend on inputs mainly from the ministries of defence and home affairs to assess and recommend the quantum of cess. These inputs may not be accurate or realistic. Costing is not a strong point with either of these two ministries and, considering the objective of the task assigned to the finance commission, the defence and internal security apparatus may be tempted to project inflated requirement in the hope that the finance commission would try to meet their expectations in a substantial measure. The commission clearly has its work cut out for itself.

The finance commission would need to recommend a moderate rate of cess, striking a balance between the ability and willingness of the taxpayers to pay the cess - in addition to the health and education cess already being paid - and the imperatives of meeting the requirement of defence and internal security to a substantial extent, if not fully. Since it is not going to be easy to determine an optimum rate of cess, the possibility of this decision being left by the finance commission to the union government cannot also be ruled out.

The fourth option would be to recommend monetisation of the idle assets like land and non-moving inventory/stores held by the defence ministry in general and the armed forces in particular. Some possibility also exists for generating revenues through commercial exploitation of civil infrastructure and certain facilities held by the armed forces. The revenue generated through

such monetisation and commercial exploitation could be used for meeting the capital and revenue expenditure of the armed forces.

Regardless of which option, or combination of options, is recommended by the Fifteenth Finance Commission, it must be supplemented by the suggestion to explore the possibility of containing defence expenditure. A committee set up by the Ministry of Defence in 2008 to review defence expenditure had pointed out that there is considerable potential for containing the expenditure and suggested that the areas in which it could be contained must be identified by the armed forces on their own volition. Nothing came out of it, though. The need for carrying out this exercise is as relevant today as it was more than a decade ago.

Bringing about jointness in training, logistics, stocking, maintenance, infrastructure, and transportation as a means of introducing economy in expenditure have been talked about for a long time, apart from saving in manpower cost by increasing the colour service, creating integrated commands, redeployment from non-combat post to combat posts, and outsourcing. The finance commission could consider reiterating the need to explore these possibilities in a time-bound manner.

It is interesting that apart from being tasked with the responsibility of addressing the concerns regarding inadequacy of budget outlay, the fifteenth Finance Commission has also been asked to examine whether

IRRESPECTIVE OF WHAT FINANCE COMMISSION RECOMMENDS, THE IMPACT OF THOSE RECOMMENDATIONS ON THE PROBLEM OF UNDERFUNDING OF DEFENCE AND INTERNAL SECURITY WOULD DEPEND ON LOGICALITY AND VIABILITY OF THE RECOMMENDATIONS AND THEIR ACCEPTANCE BY THE GOVERNMENT

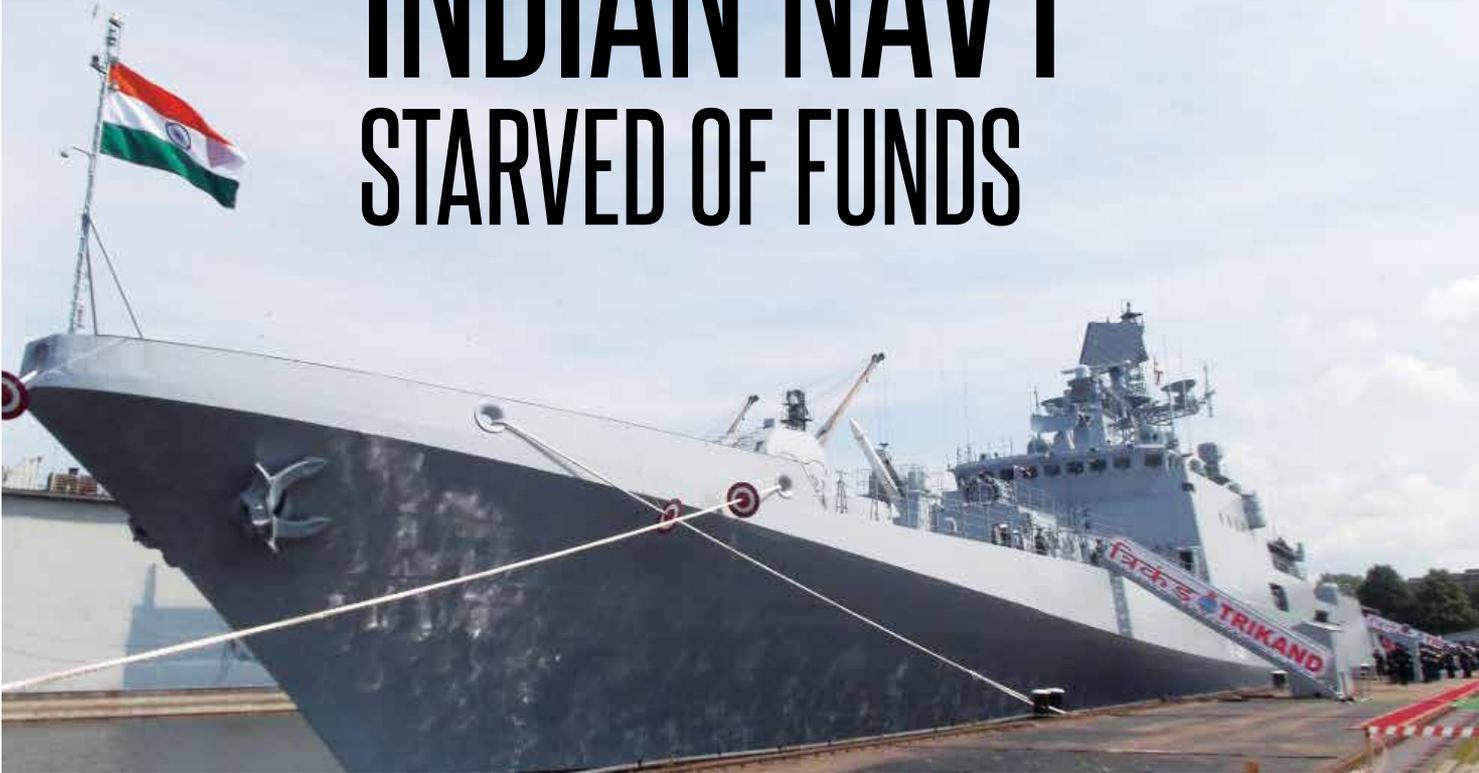
a separate mechanism for funding of defence and internal security, which will not entail lapse of funds, ought to be set up and, if so, how such a mechanism could be operationalized. One obvious question is why such a mechanism is called for specifically for defence and internal security and not for other sectors like agriculture and infrastructure. But even if this question is set aside, there does not seem to be any strong case for creating such a mechanism. At any rate, it may not be easy to work out the modality of operationalising such a mechanism.

In the face of persistent budgetary deficits, it makes little sense to transfer the money into some non-lapsable fund and keep it idle. If, on the other hand, it is to be a notional fund, it will be of little help as any appropriation from this notional fund will need to be authorised by Parliament and the money so authorised will need to be raised by the finance ministry as a part of the normal budgetary process in the year in which the money is to be appropriated out of the so-called non-lapsable fund.

All said and done, irrespective of what the finance commission recommends, the impact of those recommendations on the problem of underfunding of defence and internal security, would depend on logicality and viability of the recommendations and their acceptance by the government, which will be susceptible to political considerations, fiscal realities and the imperatives of cooperative federalism. ■

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INDIAN NAVY STARVED OF FUNDS



If India wants to be a credible Indo-Pacific power, it is imperative that the Indian Navy develops the capacity and the capability to project that power in furtherance of India's maritime interests and to ensure regional security in an inclusive and cooperative security framework

By **CMDE ANIL JAI SINGH (RETD)**

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he defining theme of Prime Minister Narendra Modi's keynote speech at the Shangri-la Dialogue in June 2018 at Singapore was the importance of connectivity in a globalised world, the need for a free and open Indo-Pacific and the role India is expected to play in the region extending from the shores of Africa to the shores of America. He made a specific mention of how the Indian Navy is building partnerships in the region to promote peace and security as well as humanitarian assistance and disaster relief.

In the last decade or more, India has been playing an increasingly important role in the region which has been further accelerated by the country's Act East Policy, Look West

Policy and the Neighbourhood First Policy, all of which have a distinct maritime orientation. There are initiatives such as SAGAR which are aimed at capacity and capability building

to secure our interests and provide regional stability in our maritime neighbourhood. As the largest naval power in the Indian Ocean and a net security provider in the region, India has been at the forefront in countering the non-traditional maritime security threats proliferating in many ways and jeopardising the delicate regional security calculus. It has also been the first responder in providing Humanitarian Assistance and Disaster Relief (HADR) in natural and man-made calamities which are becoming increasingly frequent in the maritime Indo-Pacific.

ANALYSIS

The Indian Ocean is one of the busiest waterways in the world with over 1,00,000 ships carrying over 60 per cent of the world's trade transiting through it. Ensuring the safety and security of the Indian Ocean's Sea Lines of Communication (SLOC) over which this trade travels is also critical for India as over 90 per cent of India's trade by volume and more than 74 per cent by value is seaborne. Over 80 per cent of India's energy requirements, both imported and indigenous are carried over the sea.

The foreign policy initiatives of recent years with deep strategic underpinnings with many countries in the Indo-Pacific both on our east and west have led to the Indian Navy's distant overseas deployments and multi-mission operational posture wherein over a dozen

warships of the IN are deployed in different parts of the Indo-Pacific enhancing security, building diplomatic networks, and projecting India's power while simultaneously honing their war fighting skills through intensive Fleet exercises which is its very *raison d'être*.

All this has led to the Navy having to maintain an unprecedented operational tempo in recent years. The Navy has responded magnificently but sustaining this operational tempo will sooner or later definitely take a toll on the Navy's ships and submarines if not supported with adequate resources.

The Indian Navy is structured as a balanced multi-dimensional force with full spectrum capability. However, for it to maintain a combat edge besides fulfilling the roles and missions expected of it as the pre-eminent

Navy in the region, adequate attention needs to be paid to ensure that its quantitative and qualitative capability requirements are adequately addressed. Navies do not get built in a day and it is therefore imperative that naval plans adequately balance the desired capabilities based on the likely security scenario, the national aspirations and the available resources.

The Indian Navy, as also the other services, draw up a 15 year perspective plan based on conservative estimates of the likely budgetary allocation and prioritises its requirements accordingly. This is then approved by the Ministry of Defence (MoD). Subsequent five year plans drawn up during the currency of this 15 year plan provide an opportunity to review the progress and apply



(Top) India-US sign LEMOA, now operational; INS Satpura



IN THE LAST DECADE OR MORE, INDIA HAS BEEN PLAYING AN INCREASINGLY IMPORTANT ROLE IN THE REGION WHICH HAS BEEN FURTHER ACCELERATED BY THE COUNTRY'S ACT EAST POLICY, LOOK WEST POLICY AND THE NEIGHBOURHOOD FIRST POLICY, ALL OF WHICH HAVE A DISTINCT MARITIME ORIENTATION



more alarming if one draws a comparison with the PLA Navy's ambitious shipbuilding programme and its expanding footprint in the Indian Ocean. Just to draw a comparison, the Chinese Navy is commissioning 20-25 major warships and submarines every year while the IN did not commission a single warship or submarine throughout 2018.

If India wants to be a credible Indo-Pacific power, it is imperative that the Indian Navy develops the capacity and the capability to project that power in furtherance of India's maritime interests and to ensure regional security in an inclusive and cooperative security

ENSURING THE SAFETY AND SECURITY OF THE INDIAN OCEAN'S SEA LINES OF COMMUNICATION (SLOC) OVER WHICH THIS TRADE TRAVELS IS ALSO CRITICAL FOR INDIA AS OVER 90 PER CENT OF INDIA'S TRADE BY VOLUME AND MORE THAN 74 PER CENT BY VALUE IS SEABORNE. OVER 80 PER CENT OF INDIA'S ENERGY REQUIREMENTS, BOTH IMPORTED AND INDIGENOUS ARE CARRIED OVER THE SEA

mid-course corrections to regain track. The progress of the 15-year plan is also constantly reviewed and the requirements accordingly adjusted.

This meticulous planning notwithstanding, the Indian Navy is staring at major capability deficits which are widening by the day leading to an unacceptable force level depletion which will become increasingly difficult to address. The reasons for this are many, not least of which is the reducing naval budget.

This was recently alluded to by the Chief of the Naval Staff (CNS) who expressed his concern at the Navy's share of the defence budget which has reduced from 18 per cent a few years ago to about 14 per cent now despite the recognition of the importance of the maritime sector. However, due to some deft financial planning, the Navy has been able to balance its requirements well so far. This is however clearly inadequate to meet the Navy's or indeed the country's maritime security imperatives given the long list of



(Top) Indian Navy officers in HADR operations; INS Teg

essential requirements a modern medium sized Navy should have.

The Navy has a robust ship and submarine building programme but inadequate budgetary support will jeopardise its implementation. In fact last year the previous Chief of the Naval Staff had even suggested that the delays in the shipbuilding programme may not be unwelcome. This becomes even

framework. This will be possible only if the political leadership understands the importance and operating philosophy of the navy, supports its planned force level accretion and ensures that the navy gets its fair share of the defence budget to meet its increasing commitments. ■

-The author is a veteran submariner and Vice President of the Indian Maritime Foundation and a keen follower of matters maritime. The views expressed are personal

INDIAN NAVY'S TRYST WITH SUBMARINE PROJECTS AND THE UNENDING STORY OF P-75I

In the early 1990s, the Indian Navy's submarine strength rose to a healthy 18 boats with seven operational Foxtrots, eight new Kilos, two new Shishumars and the nuclear powered INS Chakra with torpedoes and missiles which was completing its four year lease (1987-91) from the Soviet Union with highly trained crews

By **CMDE RANJIT B RAI (RETD)**



Submarines are dubbed as the sword arms of a nation for war, and nuclear submarines are the vehicles of stealth for nuclear deterrence from the seas. A submariner's motto is, 'To Run Deep-Run Silent', so one does not hear submariners boast, which is how it should be. Submariners world over are admired as the epitome of naval service, and submarine construction as the highest level of maritime military construction.



Indian Navy (IN) can boast of both attributes even though it entered submarine service in 1967 after Pakistan when INS Kalvari, Navy's first Foxtrot class submarine, was inducted from the Soviet Union well after the 17 day war of 1965. The PNS Ghazi (Ex USS Diablo Tench class on loan from US) tried to stalk Navy's Western Fleet warships off Bombay in that war and the Indian Navy was not allowed to join the war by a Cabinet decision. The PNS Ghazi lurking around in the Arabian Sea was a worry for then Prime Minister Lal Bahadur Shastri.

In the 1960s, UK had refused to supply Oberon class submarines to India after training officers and sailors at HMS Dolphin despite attempts by Admiral Lord Louis Mountbatten. Indian Navy turned to Soviet Union for supply of eight Foxtrot class submarines from 1967, which



The author is with CNS Adm Shen Jinlong



A NEW PROGRAMME PROJECT 75I (INDIA) TOOK BIRTH IN NOVEMBER 2007 WITH DAC APPROVAL AND LATER IT APPROVED EIGHT SSN SUBMARINES AFTER THE SUCCESS OF INS ARIHANT. DESIGNING BEGAN UNDER PROGRAMME BELUGA BUT ARGUMENTS ON WHICH PROJECT SHOULD TAKE PRIORITY AND WHAT EQUIPMENT INCLUDING THE LIGHTER VERTICAL LAUNCH BRAHMOS MISSILE AND AIP, ETC. DELAYED THE DECISION MAKING



Second P 75 Scorpene INS Khanderi Commissioned By Defence Minister Rajnath Singh on September 2019 at Mumbai

served it well in the war in 1971 on both coasts but Pakistani naval targets evaded them and merchant ships could not be targeted. On December 4, 1971 INS Ghazi was sunk off Vishakhapatnam in the opening bell of the 1971 war. Nine years passed when in the early 1980s the Navy acquired two Shishumar class 1500 ton HDW submarines from Germany and built two copies INS Shalki (1992) and Shankul (1994) years later in India with kits supplied to the Mazagon Dock Shipbuilders Limited's (MDL) East Yard after navy and civilian personnel were trained at IKL in Lubeck, Germany. However, due to a scandal and CBI

inquiry which was never proved, submarine building was suspended and HDW was black listed and MDL's East Yard was without work and qualified welders & builders sadly began losing the art of submarine building. A search for a new supplier began much later and Soviet Union offered to supply submarines. Eight of the ten Kilo class submarines from Soviet Union arrived by 1991.

In the early 1990s, the Indian Navy's submarine strength rose to a healthy 18 boats with seven operational Foxtrots, eight new Kilos, two new Shishumars and the nuclear powered INS Chakra with torpedoes and missiles

which was completing its four year lease (1987-91) from the Soviet Union with highly trained crews. In 1998 for the long term, the Government accepted the Naval Plan of a 30-year Submarine Building Programme on two lines of six submarines, one from the West and another from the East. Seven years passed with no movement and as HDW was black listed, only in 2005 the Ministry of Defence (MoD) placed a \$3.1 billion order on French Direction des Constructions Navales Services (DCNS) and Spanish Navantia team, called Armaris to build six Scorpene Kalvari class conventional SSK submarines

SPOTLIGHT

with MBDA Exocet SM-39 missiles and Subtics command and control system dubbed Project 75. No torpedo was chosen, nor till this article is scripted. The programme went through price escalations and delays when MDL-built equipment could not be supplied and price escalated to \$4.6 billion and Navantia walked back. The renamed DCNS ship builder Naval Group took over and commissioned the first Scorpene INS Kalvari in 2017 and the second Khanderi is scheduled to be commissioned by Defence Minister Rajnath Singh at Mumbai on September 28, 2019 in this delayed project. Therefore, the heading of this article as Navy's tryst with submarines whose strength has depleted to 15 which includes aging five Kilos.

A new programme Project 75I (India) took birth in November 2007 with Defence Acquisition Council (DAC) approval and later it approved eight SSN submarines after the success of INS Arihant.



(Top) INS Vikramaditya; Sri Lankan Naval Dockyard at Colombo

Designing began under programme Beluga but arguments on which project should take priority and what equipment including the lighter vertical launch BrahMos missile and Air Independent Propulsion (AIP), etc. delayed the decision making. The DAC revived the 75I Project and then Defence Minister Nirmala Sitharaman finally approved the procurement of six diesel-electric attack submarines under Project-75 India (Project-75 I) in June 2017 to feature advanced air independent propulsion (AIP) to enable them to stay submerged for longer duration and substantially increase their operational range with the aim that all six submarines would be constructed in Indian shipyards.

A 42-page detailed Expression of Interest (EoI) for shortlisting of an Indian strategic partner for construction of six conventional submarines under the Strategic



Indian Navy Kalvari Class submarine at sea

Partnership Model (SPM) as per Defence Procurement Procedure (DPP) 2016 and amendments was finally released in June 2018. The Original Equipment Manufacturer (OEM) will be obliged to Transfer of Technology (ToT) and the complete design to the Directorate of Naval Design (NDD). The OEM and Indian builder will be obliged to provide life cycle support and set up R&D facilities based on what Brazil has done with Naval Group to build scorpines in country. The trials will be conducted as per Chapters two and seven of the DPP 16 and the RFI states the first submarine will be delivered not later than eight years after signing the contract and subsequent submarines 12/15 months after that while assuring the quality standards. This is from experience of the delayed Project 75 and some failures in the sea trials. Also, the OEM will sign the integrity pact and co-operate with DRDO and SMSEs to supply equipment and assist in skilling based on what Larsen and Toubro Ltd (L&T) has achieved in the ATV nuclear submarine INS Arihant

Project and Naval Group in the 75 Project. As an Indian shipyard will be involved with finances, a Special Purpose Vehicle (SPV) as in appendix A of chapter seven of DPP 2016 is mandated and details will be given in the Request for Proposal (RFP).

The RFI has aroused activity as the contract will be of over \$5.5 billion and the foreign contenders for the new submarine contract include Naval Group (France), Kockums (Sweden), Rubin Design Bureau (Russia), and Howaldtswerke-Deutsche Werft/Thyssen (Germany) and Navantia (Spain) who have replied the Request for Information (RFI) with stringent qualifying terms and guarantees. Indian Air-Independent Propulsion (AIP) system will be fitted if the trials succeed with the DRDO NSTL Ambernath design or an imported system. The submarine types under consideration comprise SAAB-Kockum's A-26, Rubin's Amur-1650, Howaldtswerke-Deutsche Werft Type 214, and yet again Naval Group's improved Scorpene SSK which will team up

with Indian shipyards, later short listed and the RFP will be issued.

It is to be noted here that Pakistan Navy has operated three French Agosta-90B/Khalid and two Agosta-70 submarines, built two and modernised them at Karachi and refitted them in Turkey. Pakistan Navy (PN) is set to acquire 6/8 double hulled 6,000 tonne Type Diesel S-041 and S-039 Yuan Hybrid AIP submarines from China and construction of the boats has begun near Shanghai and the first is expected by 2020 at Ormara at PNS Jinnah and joint work has started with China as the port has a naturally protected bay and inlet. Ormara is 120 nm from commercial port of Gwadar, the other port China operates for Pakistan. China has also supplied two submarines to Bangladesh and Indian Navy will see more submarines in its neighbourhood, hence Project 751 is critical for the Indian Navy. ■

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Affair' (Addhyan ISBN 9789388644167
Variety Books) includes intrigues in the
world of Naval Intelligence*

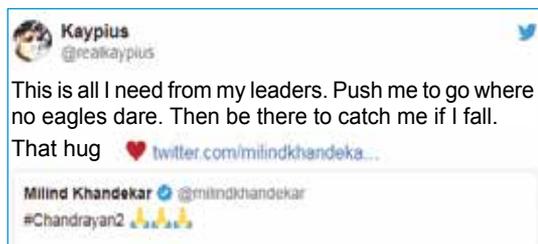
PAKISTAN NAVY (PN) IS SET TO ACQUIRE 6/8 DOUBLE HULLED 6,000 TONNE TYPE DIESEL S-041 AND S-039 YUAN HYBRID AIP SUBMARINES FROM CHINA AND CONSTRUCTION OF THE BOATS HAS BEGUN NEAR SHANGHAI AND THE FIRST IS EXPECTED BY 2020 AT ORMARA AT PNS JINNAH AND JOINT WORK HAS STARTED WITH CHINA AS THE PORT HAS A NATURALLY PROTECTED BAY AND INLET

HUGS & ROCKET SCIENCE

“Don’t lose hope. Be courageous. There are ups and downs in life. What you all have done is not a small thing. You have done a great service to the country, science and mankind. I am with you. I wish you all the best,” Prime Minister Narendra Modi told the scientists addressing at ISRO Headquarters in Bangalore

By **CDR KP SANJEEV KUMAR (RETD)**

In the dark moments of September 6-7 when earth went about its axis, millions of space enthusiasts from India sat up to watch ‘Vikram’ make a lunar landing after separating from orbiter Chandrayaan 2. After travelling 3.84 lakh kilometres, just 2.1 kilometres short of its target, the lander deviated from course. An in-depth analysis will surely follow into the cause and outcome. In space travel, two kilometres is an infinitesimal denomination. But then rocket science is an exact science that hinges on such fine mensurations.



A bigger lesson dawned on earthlings the next morning when Prime Minister Narendra Modi was received by ISRO Chairman Dr K Sivan for the ‘hot wash-up’.

Both come from humble origins. Definitely no silver spoons between them. Both surely hadn’t slept much for days: about 2-3 hours over the preceding night would be a reasonable guess. Under the circumstances, it is easy to lose patience. Setbacks like this one can overwhelm ‘hoomans’ & bring about strange emotions.

Such moments also reveal character.

I am not a fanboy or ‘bhakt’. But Sivan’s weak moment, the PM’s warm hug, arms wrapped comfortingly around a speechless & sobbing Sivan – that grace truly reflects Indian culture. It’s also a sparkling example of leadership in the face of setbacks.

In the next few months, it is this element of leadership and hand-

holding that will put an ‘Indonaut’ in space, 35 yrs after cosmonaut Rakesh ‘Ricky’ Sharma broke free of ‘mental gravity’ on Soyuz T-11.

I narrate two examples below where I saw brief glimpses of 24-carat leadership in my short voyage of half a decade on earth. I am sure you have yours.

In 1985, inspired by Ricky Sharma, I applied & got through the National Defence Academy (NDA). For my parents, much like K Sivan, NDA was rocket science. They had meagre resources that couldn’t envision such big dreams, let alone fund it. Entry to NDA meant a way of life, way beyond our capacity. And I had just made it through with a few text books, their loving support, and the midnight oil.

So when I returned from NDA after one month, tendering my unwillingness to continue with training, their world should’ve fallen apart, right?

Maybe it almost did. Only I never came to know about it.

Our neighbours, relatives & friends unanimously slammed their decision to remain supportive of my blundering ways. I had just thrown a career with nothing to fall back on.

The same warm hug received me back home. I didn’t weep; I was too stupid. My dad & mom surely did, behind my back. They stood steadfast behind my pull out. Dad took a rare few days off to put me back into the same college I had grandly exited a few months ago. Unabashedly bull-headed that he was, requesting ‘Princy’ Prof Ramanathan to “please help my son” must have laid a boulder





across his chest.

Princy welcomed me back middle of term. Such magnanimity was unheard-of in the educational system those days. Usual norm was to pit seats against money & watch parents with meagre resources – and their offsprings with cavalier attitude – twitch & shudder.

Through that episode, I grew as a person. Within a year, I launched a ‘counterattack’ & was back at Naval Academy, my dreams of becoming an aviator, possibly another Rakesh Sharma, an inch closer to reality that it was ever before.

Fifteen years later, I got somewhere there. No, not outer space, not even outside India, but among the few test pilots India nurtures in her stable – the Air Force Test Pilots School (AFTPS). Today, if not a spacecraft, I have the privilege of being in the same

Google group as Rakesh Sharma (Ricky). Ricky, as many test crew I know, is as humble as they come. I often benchmark my reactions to events with people like him. Humility has a grace the vastness of space reveals, if we choose to reflect.

Example 2 interleaves the first example. It was one of the lowest points in my life. My flying career was shipwrecked even before it took wings. I faced the prospect of never flying again, with just 250 hours under my belt, less than three months into my flying career.

Two people, both leaders of some repute & influence, came into my life.

One told me “I told you so. You are screwed. Look for another job”.

Another one, my Commanding Officer, told me “All is not lost. It’s not over till we give up. Let’s do this together. We’ll fix this”.

I would’ve never seen the main gate of Air Force Test Pilots School had I succumbed to negative strokes. Life is no rocket science. There are simple solutions to every complex issue. Computing is for machines. Humans must have heart. And soul. And empathy.

Like astronomy, the darkest moments can sometimes reveal the brightest stars. And they exist in our offices, our homes, all around us. If only we would pay heed and listen, maybe hug sometimes.

There’s a reason why Rakesh Sharma when asked by PM Indira Gandhi in 1984 how India looked from space said “saare jahan se achha” (Hindi for ‘top of the world’).

We have our hearts in the right, soft place, even if the moon-lander be a few metres off.

Thank you, K Sivan & team. Thank you, PM Modi. We shall overcome.

Houston, we don’t have a problem. ■

–The author is a former navy test pilot and his blogsite is www.kaypius.com. He can be reached at kipsake1@gmail.com

**ISRO
CHAIRMAN
DR K SIVAN'S
WEAK MOMENT,
PRIME
MINISTER
NARENDRA
MODI'S WARM
HUG, ARMS
WRAPPED
COMFORTINGLY
AROUND A
SPEECHLESS &
SOBBING TOP
SCIENTIST –
THAT GRACE
TRULY REFLECTS
INDIAN
CULTURE.
IT'S ALSO A
SPARKLING
EXAMPLE OF
LEADERSHIP
IN THE FACE OF
SETBACKS**



TO SEE WITHOUT BEING SEEN

THE PERFECT PARTNER FOR ACTIVE SYSTEMS

HENSOLDT is a world leading provider of premium sensors for protection, surveillance and situational awareness. It has a major position in the global radar, optronics and electronic warfare markets being a market leader in civilian and military sensor solutions. HENSOLDT has been working on passive radar for a number of years, starting in 2006 and the technology underlying TwInvis has been researched worldwide for more than 15 years. A passive radar TwInvis was presented to the public for the first time at the International Airshow ILA in Berlin in April 2018 and shown in operation. The radar's name is made up from "twin" + "invisible", as neither TwInvis itself nor the targets to be detected emit any signals on their own, which means that they are electromagnetically "invisible". HENSOLDT has invested significant own fundings in its development and carried out studies in cooperation with armed forces and civil authorities. This innovation is further impressive proof of the global breakthroughs that aviation research in Germany can achieve.

Currently, Hensoldt is present with its passive radar system across Europe and North America.

Can you share more about Hensoldt's TwInvis Passive Radar and the technology of this Radar?

SHADMAN: TwInvis is a passive radar that adds a new dimension to the world of surveillance and situational awareness. Light, small and easy to deploy, TwInvis is equally at home in urban



areas or remote borders. Its economical price and maintenance and silent operation make it the right system to enable coverage in "white spots" and detection of targets formerly flying "under the

radar". It is even considered to be accurate enough for application in the Air Traffic Control domain.

TwInvis uses several transmission sources from various locations. It also can interconnect several sensors into a sensor cluster. Such transmitters and TwInvis sensors can be separated from each other by some km up to more than 100 km. Unlike, other systems based on passive emitter tracking which requires

THE RADAR'S NAME IS MADE UP FROM "TWIN" + "INVISIBLE", AS NEITHER TWINVIS ITSELF NOR THE TARGETS TO BE DETECTED EMIT ANY SIGNALS ON THEIR OWN, WHICH MEANS THAT THEY ARE ELECTROMAGNETICALLY "INVISIBLE"



SHADMAN ANDLEEB

Managing Director, HENSOLDT India

Aircraft to emit, TwInvis do not depends on any such transmission and hence it is a true Passive Systems.

Working as mere receivers, passive radar systems detect aircraft by analysing the signals that they reflect from existing third-party emissions such as radio and TV stations. TwInvis obtains a precise airspace picture by simultaneously analysing a large number of frequency bands. For example, up to 16 FM transmitters (analogue radio) plus 5 frequencies used by several DAB and DAB+ transmitters (digital radio) as well as DVB-T and DVB-T2 (digital, terrestrial television) can be simultaneously analysed for the first time.

Furthermore, our expertise in latest generation of software will act as catalyst for unprecedented performance in terms of range and precision of detection.

The word Passive Radar seems quite Ironic in terms of Radar Technology; can you explain more about it?

SHADMAN: You are right. When the term radar is used, everyone immediately pictures the same thing: large radar dishes, a flashing round screen, a monotonous beeping. Since the 1930s, radar has been the most important technology for locating aircraft.

Traditionally the air surveillance is being done using mono-static active radar systems which transmit high RF energy to detect flying targets. Conventional radars, admittedly, perform the air surveillance tasks well providing

THE KEY FUNCTIONAL ADVANTAGES OF PASSIVE RADARS ARE AIR SURVEILLANCE AT A LOW COST, UNDETECTABLE CONFIGURATION WHILE NO COOPERATION / EMISSIONS FROM THE TARGETS ARE NECESSARY, EFFECTIVE COUNTER TO STEALTH AIRCRAFTS

detection and tracking of targets of interest. However, these Radars have certain drawbacks like, high power transmissions which give away their position, ineffective to Stealth Aircrafts, High Cost and Spectrum usage which requires authority approvals and becomes more critical nowadays as frequency bands needed for civil applications. Passive radars have the potential to overcome the above.

The term “passive” emphasizes, that in general the sensor is under control, whereas transmitters are preferably non-cooperative transmitters of opportunity, such as FM radio or TV station transmitters.

Actually Passive Radar systems is a class of radar systems that detect and track objects by processing reflections from non-cooperative sources of illumination in the environment, such as commercial broadcast and communications signals. A Passive Radar system does not have its own transmitter, it only has a receiver. The transmitter associated to it is non-cooperative or we can call it transmitter of opportunity.

The key functional advantages of passive radars are air surveillance at a low cost, undetectable configuration while no cooperation / emissions from the targets are necessary, effective counter to stealth aircrafts. For those of you saying “passive radar is around for a long time, so what is all the fuzz about?”: For decades there’s another class of passive systems also referred to as passive radars. So what’s the difference? It is simply that those systems rely on transmissions from the target, e.g. from their transponders, radio transmissions, or their onboard radar, better described as ELINT. Since ELINT does not use reflected waves but direct transmission, the term “radar” is a bit far fetched.

Where are the possibilities of usage of a Hensoldt’s TwInvis Passive Radar?

SHADMAN: TwInvis radar is significantly smaller than previous radar systems and can be easily integrated into an off-road vehicle or a van. Since it does not emit its own signals, it can

also be easily used in urban areas – unlike active radars. And it can also be used more quickly, because there is no need for coordination with the authorities. TwInvis is therefore perfect for operations in urban and often spectrum congested areas – even at short notice.

It can also be used at airports to supplement the sensors used in air traffic control, for example as a backup. TwInvis can be used as a new instrument for monitoring the airspace at small and medium-sized airports that are not yet equipped with primary radar. And it also provides support in areas with severe restrictions, such as areas where mountain slopes or other obstacles impede normal radar waves.

TwInvis has highly sensitive digital receivers which makes it possible for one TwInvis system to keep a track of up to 200 aircraft in 3D within a radius of 250 kilometres. This was something which was not thought of a few years ago and will open up completely new options for applications in air defence and air traffic control.

What will be the Role of Hensoldt’s TwInvis Passive Radar in Indian Context?

SHADMAN: India shares borders with 7 countries; Pakistan, China, Nepal, Bhutan, Bangladesh, Burma and Afghanistan. While considering the passive radar as the potential solution for air defence, following may be the main requirements of Indian defence services is long detection range for aerial targets, Ability to detect Stealth Targets (anti-stealth), Geographical coverage across the border areas and urban area security.

Passive radar solution for long range detection could be used as early warning system and/or as the backup system with reliable detection performance. Silent detection of silent targets, meaning: the system never gives away its own position while simultaneously it tracks targets that do not at all emit any radiation. This allows hidden operation at critical scenarios for early warning. Passively track a target and trigger a guided missile, hence keeping the complete countermeasure undetectable to the enemy.

IN CONVERSATION



“WE SEE TREMENDOUS STRENGTH AND OPPORTUNITY IN INDIA’S DEFENCE INDUSTRY AND WE’RE VERY EXCITED BY THE INCREDIBLE POTENTIAL IN INDIA”



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*s Lockheed Martin’s Vice President - Strategy and Business Development, Dr. Vivek Lall has been spearheading the F-21 campaign aligned to robust and vibrant Make in India initiative. Dr. Vivek Lall is a world renowned aerospace and defence leader and was appointed last year by the US Government to its NextGen Advisory Committee. Interacting with **Raksha Anirveda**, Dr. Lall candidly elaborates on Lockheed Martin’s vision for India and the vibrant and growing synergies between India and US defence cooperation. An excerpt:*



Lockheed Martin unveiled F-21 multi-role fighter jet at Aero India 2019 and has offered to produce it locally, strengthen the country’s integration into the world-wide

network of advanced fighter aircraft technology and meet all of India’s performance, capability and advanced technology requirements. Kindly elaborate.

VL

The F-21 will truly be a game-changer for the Indian Air Force, Indian industry and India-US strategic ties. We are confident the F-21 is the best solution to meet the Indian Air Force’s capability needs, provide Make in India industrial opportunities, and accelerate India-US cooperation on advanced technologies, but not limited to fighter aircraft.

An F-21 partnership integrates India into the world’s largest and most successful fighter aircraft ecosystem - a USD \$165 billion market and demonstrates Lockheed Martin’s commitment

to India: to deliver an advanced, scalable fighter to the Indian Air Force that also provides unrivaled industrial partnership opportunities.

The F-21 delivers an advanced single-engine, multi-role fighter at the most optimal Life Cycle Cost for the Indian Air Force with the longest service life of any competitor – 12,000 flight hours. Simply put, the F-21 goes further, faster, and stays longer than the competition. The F-21 will meet all of India's performance, capability and advanced technology requirements, and provide unmatched opportunities for Indian companies of all sizes and suppliers throughout India.

Lockheed Martin has established two joint ventures with Tata Advanced Systems Limited (TASL) for manufacturing aeronautical components for the C-130 along with F-16 wings. What has been your experience in collaborating with Indian partner?

VL We are very proud of our longstanding, successful partnership and joint ventures with Tata. Robust, long-term defence partnerships are built on commitment and trust, which requires investing in people, as well as products and platforms. We're certainly doing both with Tata.

For example, in collaboration with Tata Advanced Systems we have established an industrial base in Hyderabad where we currently produce C-130 empennages – which incidentally are on all Super Hercules aircraft globally – and a metal-to-metal bonding facility at the same location. This bears testimony to our contribution to the development of Indo-US defence industrial partnership.

At Aero India 2019, Lockheed Martin signed a Certificate of Partnership with BEML – a Defence PSU. What are the avenues that you would be exploring for collaboration with BEML?

VL We are very excited about our relationship with Bharat Earth Movers Ltd (BEML). Our commitment and

announcement in February this year during Aero India is to further dialogue and open up avenues of collaboration in aerospace ground support equipment. BEML has a history of successfully demonstrating design and development capabilities in this area for the Tejas LCA, as well as other defence and commercial projects.



THE F-21 DELIVERS AN ADVANCED SINGLE-ENGINE, MULTI-ROLE FIGHTER AT THE MOST OPTIMAL LIFE CYCLE COST FOR THE INDIAN AIR FORCE WITH THE LONGEST SERVICE LIFE OF ANY COMPETITOR – 12,000 FLIGHT HOURS



Lockheed Martin's F-21

IN CONVERSATION

 *You've long been associated with US India Business Council and led the business delegations to India in recent years. Please elaborate on India-US strategic business relations and development so far?*

VL We are very encouraged by the positive trend we're seeing in India-US relations, including on the defence-industrial partnership front. Defence-industrial partnerships have long been a hallmark of strategic ties and trust between the two nations. For example, in collaboration with Tata Advanced Systems we have established an industrial base in Hyderabad where we currently produce C-130J empennages — which incidentally are on all Super Hercules aircraft globally — and a metal-to-metal bonding facility at the same location. This bears testimony to our contribution to the development of Indo-US defence industrial partnership.

We see tremendous strength and opportunity in India's defence industry — both private and public. We are always looking for strategic



“OUR COMMITMENT AND ANNOUNCEMENT IN FEBRUARY THIS YEAR DURING AERO INDIA IS TO FURTHER DIALOGUE AND OPEN UP AVENUES OF COLLABORATION IN AEROSPACE GROUND SUPPORT EQUIPMENT. BEML HAS A HISTORY OF SUCCESSFULLY DEMONSTRATING DESIGN AND DEVELOPMENT CAPABILITIES IN THIS AREA FOR THE TEJAS LCA, AS WELL AS OTHER DEFENCE AND COMMERCIAL PROJECTS”

DR. VIVEK LALL, VICE PRESIDENT, LOCKHEED MARTIN

Indian industry partners across the country — Indian companies of all sizes, including Micro, Small & Medium Enterprises (MSMEs) and suppliers throughout India — to collaborate and explore security solutions unique to India.

 *Lockheed Martin has been in talks with India to provide air defence to the ships here. Any progress on that front? Also tell us about the Helicopter Integration Programme.*

VL Sikorsky, a Lockheed Martin company, has responded to the request for Expression of Interest (EOI) for India Naval Utility Helicopter (NUH) programme. We look forward to providing this capability to India and remain committed to fostering technology development, manufacturing and strategic collaboration in India while maintaining high-value, high-skill technical jobs across our US and global supply base.

In another win-win effort for the U.S. and India, Lockheed Martin stands ready to support



Indian Air Force C-130J Super Hercules

both countries for a government-to-government procurement of 24 MH-60R helicopters as part of the Multi Role Helicopter program. We are confident the MH-60R "Romeo" is the right aircraft for India's Navy that provides a vital capability in the Indo-Pacific region. Operational and deployed today with the U.S. Navy as the primary anti-submarine warfare anti-surface weapon system, the MH-60R helicopter is the world's most advanced maritime helicopter. It is the most capable naval helicopter available today designed to operate from frigates, destroyers, cruisers and aircraft carriers.



Sikorsky MH-60R Seahawk

 **The recently organized Suppliers Conference by Lockheed and Tata Advanced Systems Limited was a success. What were the major outcomes from it? Tell us more about it.**

VL Lockheed Martin and Tata co-hosted a successful supplier conference with prospective Indian industry partners in New Delhi on July 16-18. During the conference, Lockheed Martin Aeronautics, Lockheed Martin Rotary and Mission Systems (RMS), and Tata, Lockheed Martin's strategic partner in India, discussed partnership opportunities to strengthen US-India defence industrial ties, 'Make in India' partnerships and Lockheed Martin's F-21 and RMS offerings for India.

Twenty-six Tier 1 Lockheed Martin suppliers travelled from around the world to the conference, where they met with approximately 100 international and Indian aerospace & defence suppliers, MSMEs & start-up companies.

In addition to Tata, Lockheed Martin industry partners and

suppliers include BAE Systems, Cobham, Collins Aerospace, Curtiss-Wright, Eaton, Elbit Systems, Elta, GE Aviation, Honeywell, L3Harris, Leonardo, Martin Baker, Meggitt, Moog, Northrop Grumman, Parker Hannifin, Pratt & Whitney, Rada, Rafael, Raytheon, Safran Electrical & Power, and other leading global defence and aerospace companies.

 **The dates and venue for DefExpo 2020 have been announced. What are your plans regarding participation in it? Kindly provide insights into the India specific products and tech systems offering you'll be showcasing at the event.**

VL We look forward to participating in DefExpo 2020. We plan to showcase a range of Lockheed Martin programmes and partnerships, but not limited to F-21 and S-76D. It will be another dynamic event and we're excited to be a part of it.

 **Why should India go for strategic partnership with**

Lockheed? In what way Lockheed products are better than that of its competitors?

VL For more than 25 years, Lockheed Martin has been committed to building trust, technology development, and strategic collaboration with India. Lockheed Martin has two state-of-the-art manufacturing joint ventures in India with Tata Advanced Systems. Lockheed Martin has an unmatched track record of establishing robust aerospace and defence industrial ecosystems, including new production and sustainment exports, across advanced fighter platforms.

We recently emphasized our commitment to India by announcing a landmark Make in India partnership with Tata to produce F-16 wings in India for all future customers. We see tremendous strength and opportunity in India's defence industry and we're very excited by the incredible potential in India. ■



**LOCKHEED
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OF 24 MH-60R
HELICOPTERS
AS PART OF THE
MULTI ROLE
HELICOPTER
PROGRAM**

BUSINESS INITIATIVE

INDIA'S LARGEST AIRPORT CITY TAKING SHAPE AT GMR HYDERABAD INTERNATIONAL AIRPORT

Globally, the concept of Airport City has gained substantial momentum. It's gaining traction in India too under the Public Private Partnership (PPP) model for airport development

A

irport City or Aerotropolis is an urban ecosystem that is anchored with an airport at its core. Over the past few years, the development of Airport City has gained substantial momentum with its popularity spreading rapidly on a Global scale. In India, too, the concept of Airport City is gaining traction, especially after the introduction of Public Private Partnership (PPP) model in airport development. GMR Group, the well-known infrastructure company and airport developer & operator has made some pioneering endeavors towards conceptualizing and developing Airport City in India.

GMR Hyderabad International Airport Ltd. (GHIAL), a GMR Group Company - which is operating Rajiv Gandhi International Airport (RGIA), Hyderabad - is developing India's largest Airport City around the Airport. Hyderabad Airport City offers an integrated ecosystem covering commercial office space, retail, leisure & entertainment, hospitality, education, healthcare, aerospace and logistics. Being a Greenfield project, the master plan of RGIA envisioned creating a world class Aerotropolis right from the inception.

The Hyderabad Airport City offers best in class infrastructural support for the prospective and existing businesses viz. redundancies built in Power, Telecom & IT infrastructure for 24/7 operations; dedicated power link-up with the state grid for reliable power supply, round the clock security, express connectivity with the city; pollution free and well-planned ecosystem. There is a Notified Area Committee (NAC) which is a one-stop clearance window for all building plan approvals - thus contributing towards ease of doing business. It focuses on sustainable development using Green Technologies and new generation Smart digital infrastructure along with quality physical infrastructure.



Aman Kapoor
CEO, GMR Airport Land Development

AEROSPACE & INDUSTRIAL PARK

Key attraction of Hyderabad Airport City is GMR Aerospace & Industrial Park, which is a modern, state-of-the-art Airport-based multi-product Special Economic Zone (SEZ). The Park offers Special Economic Zone (SEZ) for units with predominantly export oriented business as well as Non SEZ land for customers who wish to deal in the Domestic Tariff Area within India. The Park also houses India's 1st Airport based Free Trade Zone - GIFTZ (GMR International Free Trade Zone).

GMR Aerospace & Industrial Park provides 'ready-to-use' industrial infrastructure allowing companies to focus on their core business. The Park enjoys greater security by virtue of being housed within RGIA. Supply of utilities like power and water are highly reliable. The Park also enjoys the complete airport ecosystem like proximity to Air Cargo Terminal, availability of 5-star Hotel, reliable and affordable Transport, Emergency Services, etc.

A major USP of the Park is its Airside facing land in both SEZ and non-SEZ locations. This land can be utilized for setting up of Final Assembly Line of small & medium Aircrafts, Helicopters and Drones. The



adjacent taxiway and runway system are available for live testing of aircraft systems, as permitted by the Air Navigation bodies. The Airframe MRO facility at the SEZ offers complimentary services to the needs of Airlines, Aircraft manufacturers and other Aerospace companies and is a win-win situation for all.

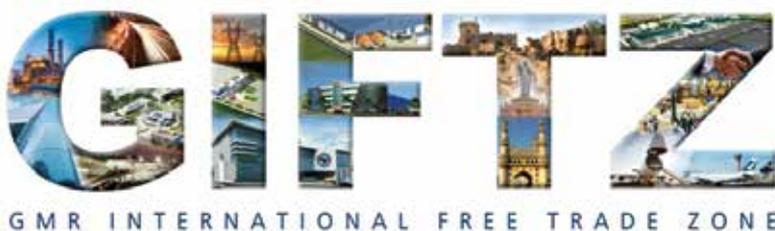
The Park counts some of the renowned Global companies as its partners, such as CFM,

Safran, Pratt & Whitney, Filtration Group etc.

Mr. Aman Kapoor, CEO, GMR Airport Land Development, opines, "Hyderabad Airport City is creating a paradigm shift in the way of doing business in India. The Airport city brings speed, agility and connectivity as unique business propositions. Offering a gateway Airport with growing air connectivity, passenger traffic and smart technologies in place, the Hyderabad Airport City is unfolding a landmark urban form that is competitive, attractive, and sustainable. We aspire to grow intelligently, bringing about good returns to the Airport, its users, businesses, surrounding communities and the entire region we serve."

"Hyderabad Airport City is creating a paradigm shift in the way of doing business in India. The Airport city brings speed, agility and connectivity as unique business propositions"

*Aman Kapoor
CEO, GMR Airport
Land Development*



INDIA'S STEALTH FIGHTER PROGRAMME

INDIGENOUS AMCA CAN TAKE OFF ON F-35 WINGS

With the Russians out of the picture, the Indian Air Force has two options – the Lockheed Martin F-35 Lightning II and India's own HAL AMCA stealth-fighter programme

By **RAKESH KRISHNAN SIMHA**

In July 2019, Russia once again offered Indian Air Force (IAF) to co-develop a variant of the Sukhoi Su-57 stealth fighter. "I believe that we should resume this project, Russia is open to that," Deputy Director of Russia's Federal Service for Military and Technical Cooperation, Vladimir Drozhzhov, said in Moscow. "We are ready and are proposing this programme to our Indian partners."

The new Russian offer comes a year after India withdrew from the joint development of the Fifth Generation Fighter Aircraft (FGFA), owing to the Indian Air Force's unhappiness with the progress of the project. India was committed to investing \$6 billion in the stealth fighter, with \$295 million directly transferred to Russia in 2010. Plus, India had agreed to spend an additional \$30

billion for 144 stealth fighters.

The Indian side had a long list of complaints about the joint project. When New Delhi and Moscow inked the FGFA deal in December 2011, Hindustan Aeronautics Limited (HAL) had only 15 per cent of the work share but was paying 50 per cent of the development cost.

The IAF's foremost issue was the aircraft lacked an engine that could supercruise – the ability to fly for extended periods at supersonic speed without engaging fuel guzzling after burners.

The service also wanted a two-seat variant of the aircraft, with a more powerful 360-degree Active electronically scanned array (AESA) radar and greater

stealth characteristics. While exact stealth capabilities are classified, it is reliably estimated that the Su-57 has a frontal radar cross-section (RCS) of 0.1 square meters, a hundred times larger than the American F-35 stealth jet's minimum of 0.001 square meters.

Additionally, the Russian jet is significantly more visible to radars from the side or rear aspect, writes Piotr Butowski in Aviation Week & Space Technology. "The Russian military appears more accepting of a defensive fighter that is stealthiest when soaring head on towards interlopers at the edge of their radar coverage. India, however, would prefer an all-aspect stealth aircraft that can also penetrate defended enemy airspace to take out key targets such as nuclear weapons sites, potentially contributing to strategic deterrence."

Another critical flaw in the Russian aircraft was the lack of a modular engine, which meant that the turbofans would have to be shipped to Russia frequently for overhauls, rather than maintained locally. The high maintenance requirements of the MiG-29 and Su-30MKI fighters serving in the Indian Navy and IAF remain a sore point with the Indian military.



SU-57: GETTING AIRBORNE

In hindsight the IAF did well to cut its losses early in the programme. It was vindicated when Russia too cancelled its plans to buy 200 stealth jets and decided to buy additional Su-35s instead. It was only in June 2019 that Russia's Defence Ministry placed an order with Sukhoi for 76 fighters to be delivered by the end of 2027. This will definitely give the programme a boost because manufacturers cannot make improvements by building prototypes alone.

So should India now get back on board? "The problem is that the Su-57 is still in an intermediate configuration and will require a lot of work and funding to become mature," says Butowski.

The Russian aviation sector has struggled to meet deadlines for the flagship stealth programme. The project has been proceeding in fits and starts and there seems to be no guarantee that Sukhoi will deliver this time round. The recession hit Russian economy has been further impacted by Western sanctions which have slowed down development in several key defence projects. Another issue that upset the IAF was the total lack of transparency in the project. Not only IAF pilots were not allowed to test fly the T-50 prototype, but also India was not even invited to the inaugural flight in January 2010. That opaque policy hasn't changed



HAL Advanced Medium Combat Aircraft (AMCA) stealth-fighter programme is under process

in nearly a decade. Aside from some assertions from the company that "everything is going as planned", there is no information about the real status of work on the Su-57's systems and weapons.

Clearly, the Russian leadership seems to be in no hurry to take the stealth programme to its logical conclusion – the creation of a world class air-dominance fighter.

The IAF can live with a stealth fighter that is not completely stealthy because the Su-57 compensates with super-maneuvrability which is a hallmark of Sukhoi's Flanker (Su-27) series aircraft. This gives the aircraft a huge advantage in within visual range dogfights. However, the service cannot depend on an aircraft that is a ghost and exists only on paper.

CAN LIGHTNING REACH INDIA?

With the Russians out of the picture, the IAF has two options – the Lockheed-Martin F-35 Lightning II and India's own HAL AMCA stealth-fighter programme.

Let's take the American fighter first. The primary appeal of the aircraft is its stealth. According to Lockheed, the F-35 will give US pilots "First Look, First Shot, First Kill" capability. Its designers are betting on stealth and long-range radar to compensate for its lack of super-maneuvrability.

However, stealth is not really all that it is cracked up to be; it is not the cloak of invisibility. This is because there is no such thing as single radar in a war zone. "There are lots of radars," says aerospace engineer Pierre Sprey. "And you can't be nose-on or dead-level to every radar in the theatre. There are always going to be radars that are going to be shining up (from below) or looking from above - they can all see you."

Secondly, for a brand new aircraft, the F-35 has a low availability rate. "Overall fleet-wide monthly availability rates remain

IAF CAN LIVE WITH A STEALTH FIGHTER THAT IS NOT COMPLETELY STEALTHY BECAUSE THE SU-57 COMPENSATES WITH SUPER-MANOEUVRABILITY WHICH IS A HALLMARK OF SUKHOI'S FLANKER (SU-27) SERIES AIRCRAFT. THIS GIVES THE AIRCRAFT A HUGE ADVANTAGE IN WITHIN VISUAL RANGE DOGFIGHTS.



DIFFERENT STROKE



Clockwise left: Su-30 MKI; Su-57; HAL Ajeet and LCA Tejas



around 50 per cent, a condition that has existed with no significant improvement since October 2014, despite the increasing number of new aircraft,” says the annual report from the Pentagon’s Director of Operational Test and Evaluation. However, this is not a deal breaker as stealth aircraft are in their first generation and things can only improve from here.

Thirdly, can the aircraft be maintained in India? Because the F-35 is basically a flying computer with massive lines of software bundled with advanced technologies, it would require extended weeks of maintenance by dedicated Lockheed aircrews. Because some of the new technologies in the aircraft are

heavily classified, certain areas of the aircraft will be no-go areas for non-American maintenance crews. This could mean either waiting for Lockheed crews to arrive onsite from the US, or shipping the aircraft back to a maintenance hub overseas. (Historically, the US has been paranoid about its cutting edge technologies ending up in Russian hands.)

Lastly, the F-35 – which is slowly overcoming its developmental problems – is first being offered to key partners such as Japan, the Netherlands, Italy and the UK. There are other major buyers such as Israel and South Korea in the queue. Some like Australia may have to wait a decade or more before their orders are completed.

In this backdrop, it could take a miracle for India to jump the queue.

If Lockheed is able to remove the kinks in the programme, there could be a realistic chance of the IAF being interested in the F-35. According to *The National Interest*, an American bimonthly international affairs magazine, the downside of the F-35 from India’s point of view is that there would likely be limited prospects for technology transfer and local manufacture, though Lockheed could possibly offer some Indian support facilities as a concession. Investing in the F-35 would tie India closely to the United States for decades, as the fighter’s onboard computer and proprietary ground-based logistics system will require ongoing contractor support



from Lockheed. As the United States seeks to counterbalance China's rising power, New Delhi shares more political interests with Washington than it does with Moscow.

AMCA: FUTURE STEALTH

With China producing not one but two different stealth fighters, the J-20 and J-31, there is a need for India to speed up its act. The Indian version of the stealth fighter was originally envisaged as the Advance Medium Compact Aircraft (AMCA). The project remains frozen currently with Hindustan Aeronautics Limited's (HAL's) Aeronautical Development Agency (ADA) seeking to secure funding to the tune of Rs 5,000 crore.

In February 2019, Air Marshal B Suresh, Air Officer Commanding-in-Chief (AOC-in-C), Southern Air Command, said that 20 acres of land had been identified by the Defence Research and Development Organisation (DRDO) for the AMCA project in Coimbatore. This suggests that the government is finally showing some urgency in this area. The Bangalore-based Aeronautical

Development Agency – which designed the Tejas warplane – will be the lead agency within the DRDO to design the fighter. The ADA pitches the AMCA as a stealth jet that will have “extended detection range and targeting, supersonic persistence and high speed weapon release”. Close-combat operations will be facilitated by “high angle of attack capability, low infrared signature and all round missile warning system”.

The ADA has a steep learning curve in stealth fighter development. If the agency goes solo, and the extended development cycle of the Tejas fighter is any indication, realistically it could take a decade or more to refine the multiple new technologies (such as AESA radar, high-performance turbofan engines, radar-absorbent materials) before the AMCA is ready. As per DRDO estimates, the AMCA's first flight will be around 2028, which means induction would be around 2035. In viewing of the strides made by the Chinese, the IAF cannot wait that long.

Some form of foreign collaboration with experienced manufacturers can help avoid India

reinvent the wheel. Perhaps a deal along the lines of the Rafale to buy a limited number of F-35's from Lockheed could introduce Indian scientists to the complexities of stealth fighter development.

Even if the Indian role in a future HAL-Lockheed project remains confined to customisation and parts – rather than joint development – it could still turn out to be valuable exposure for Indian scientists. Here one needs to look at the substantial Indian contribution to the Su-30 Flanker programme. The Indian MKI version of the jet is now the most advanced Su-30 in the world, with the Russian Air Force also going in for the same standard.

India needs to make a kick start its stealth fighter programme and unlike the crowded fourth generation market, there aren't many options in fifth generation fighters.

CONCLUSION

Until the Tejas was inducted, India had lacked a locally built jet fighter since the 1970s when it had the Marut and Gnat/Ajeet. Both were excellent fighters – especially the Gnat which was a scare word in the Pakistan Air Force – but were retired quickly because the IAF under the influence of the import lobby started importing foreign fighters. India thus lost development continuity. This blunder must not be repeated with the stealth fighter programme because airpower in the 21st century will reflect India's manufacturing strength. With warplanes growing in complexity and costs, and hostile stealth aircraft arriving in India's neighbourhood, imports must be limited so that local manufacturing can take off. ■

– The author is a New Zealand based defence analyst. His work has been quoted extensively by leading think tanks, Universities and publications world wide

THE BANGALORE-BASED AERONAUTICAL DEVELOPMENT AGENCY – WHICH DESIGNED THE TEJAS WARPLANE – WILL BE THE LEAD AGENCY WITHIN THE DRDO TO DESIGN THE FIGHTER. THE ADA PITCHES THE AMCA AS A STEALTH JET THAT WILL HAVE “EXTENDED DETECTION RANGE AND TARGETING, SUPERSONIC PERSISTENCE AND HIGH SPEED WEAPON RELEASE”

MUSINGS FROM RUSSIA

VLADIVOSTOK

WHERE MODI'S INDO-PACIFIC MEETS PUTIN'S EURASIA

Vladivostok summit witnessed many firsts including first-ever visit by an Indian prime minister to this Asian part of Russia and concluded with the signing of a number of bilateral accords with long-term economic and geopolitical implications in a positive way

By **VINAY SHUKLA**



Few years ago it looked that except for the hype, the Indo-Russian strategic partnership was in a state of flux with a bleak future. Emergence of an anti-India Russia-Pakistan-China axis looked imminent to experts linked arms lobbies, while Moscow was disturbed at the growing Delhi – Washington bonhomie, above all their concept of Indo-Pacific to contain China, which could bring the US war machine closer to Russia's Far Eastern borders at a time when NATO has already stepped into some of the former Soviet republics in the course of eastward expansion and crippling sanctions over restoring its sovereignty over Crimea.

However, the two-day Vladivostok visit of Prime Minister Narendra Modi as the chief guest of the Eastern Economic Forum (EEF) held for the fifth time in the Pacific fore-post of Russia and for annual, 20th bilateral summit at the invitation of President Vladimir Putin has put the things into right perspective.

Reiteration of Moscow's pro-India stand on Jammu and Kashmir in the wake of abrogation of article 370 not only further paved the ground for Modi-Putin summit but also dispelled the fears about Russia towing pro-China and Pakistan line in such a sensitive issue for New Delhi.

Vladivostok summit has witnessed many firsts including first-ever visit by an Indian prime minister to this Asian part of Russia and concluded with the

signing of a number of bilateral accords with long-term economic and geopolitical implications in a positive key.

The Memorandum of Intent (MoI) between the Indian Ministry of Shipping and the Ministry of Transport of the Russian Federation on the Development of Maritime Communications between the Chennai and Vladivostok should be seen as major development in advancing Modi government's Indo-Pacific agenda, which goes beyond the narrow aim of containing China, but virtually covers a huge swathe of space between southern tip of Africa to the President Putin promoted concept of Eurasia by making Vladivostok (Master of the East in Russian) a hub empowered by New Delhi's "Act Far East" policy. Incidentally, this route-in



Prime Minister Narendra Modi with Russian President Vladimir Putin during India-Russia summit

future extending right up to Arctic for deliveries of Russian LNG to India for decades - passes through South China Sea, thus Moscow also becomes a stakeholder in the freedom of shipping in this part of the world.



THE MEMORANDUM OF INTENT (MOI) BETWEEN THE INDIAN MINISTRY OF SHIPPING AND THE MINISTRY OF TRANSPORT OF THE RUSSIAN FEDERATION ON THE DEVELOPMENT OF MARITIME COMMUNICATIONS BETWEEN THE CHENNAI AND VLADIVOSTOK SHOULD BE SEEN AS MAJOR DEVELOPMENT IN ADVANCING MODI GOVERNMENT'S INDO-PACIFIC AGENDA

relationship," Foreign Secretary Vijay Gokhale said briefing the media after Modi-Putin talks. According to him it was important because the Prime Minister has repeatedly called for changing the nature of our relationship with all major defence partners from a buyer-seller relationship to one of co-production and in a sense this agreement is imbued with the spirit of that vision.

"It will be co-production in India in an inter-governmental format," Gokhale explained.

The two countries are already producing world's supersonic BrahMos cruise missile for the Indian Army, Navy and Air Force and work is underway on more advanced BrahMos-NG version. Projects for the production of 200 Kamov Ka-226T multirole utility helicopter in India for the armed forces and 750,000 Kalashnikov AK-203 assault rifles in Korwa

Agreement between the Government of the Republic of India and Government of the Russian Federation and on the co-operation in the production of spare parts for Russian/Soviet military equipment is another

key bilateral accord signed in the presence of Prime Minister Modi and President Putin in Vladivostok. It is of great importance for India's defence and security.

"I think this is an important breakthrough in our defence

MUSINGS FROM RUSSIA



Su-57E aircraft

G2G AGREEMENT BETWEEN INDIA AND RUSSIA AND ON THE CO-OPERATION IN THE PRODUCTION OF SPARE PARTS FOR RUSSIAN/ SOVIET MILITARY EQUIPMENT IS ANOTHER KEY BILATERAL ACCORD SIGNED IN THE PRESENCE OF PRIME MINISTER MODI AND PRESIDENT PUTIN IN VLADIVOSTOK. IT IS OF GREAT IMPORTANCE FOR INDIA'S DEFENCE AND SECURITY.

plant, Amethi in partnership with OFB are under various stages of implementation.

RUSSIA TO REMAIN INDIA'S KEY DEFENCE PARTNER FOR YEARS TO COME

Although no concrete agreements were made during the summit are expected to be finalised during the annual meeting of the Indo-Russian Inter-governmental Commission (IRIGC-MTC) on military-technical cooperation in New Delhi in October. However, overall defence cooperation was discussed by the two leaders in detail, the final statement of the summit indicates.

Expressing their satisfaction at the close military and military-technical cooperation as a pillar of bilateral "Special and Privileged Strategic Partnership", the two leaders agreed to extend the ongoing defence cooperation programme for another 10 years as the current programme for 2011-2020 is expiring next year. They expressed their commitment



to upgrade bilateral defence cooperation, including by fostering joint development and production of military equipment, components and spare parts, improve the after-sales service system and continue holding regular joint exercises of the Armed Forces of the two countries.

In defence cooperation trust will be Make in India through transfer of technologies and setting up of joint ventures. While aspiring to further develop the cooperation between their armed forces beyond bilateral war games, the two countries also conceded the need for enhancing cooperation through military-

political dialogue, training in each-other's military institutions and agreed to work out the framework for reciprocal logistics support. According to sources there is a clear understanding that except Russia no other country is going to share with India some of the critical and sensitive technologies like nuclear submarines, hypersonic missiles. The US pressure and threats of CAATSA sanctions to scrap the S-400 air defence systems deal with Russia is a clear indication of this trend.

- The author is Editor-in-Chief of Russia-based DishaMoscow news portal. Views expressed are personal.

BRAHMOS DEMONSTRATES INDIAN FLAG AT MAKS-2019

This year at MAKS-2019 a biannual international airshow at Zhukovskiy near Moscow, BrahMos Aerospace was the lone Indian entity to display its air-launched version of the world's fastest cruise missile developed for the IAF's deadly Su-30MKI fleet. BrahMos Aerospace is an India-based joint venture between DRDO and Russia's NPO Mashinostroyeniya. However, Hindustan Aeronautics Limited (HAL), a regular exhibitor at the show was missing this year. An Indian Air Force (IAF) delegation led by Air Marshal Amit Dev, Director General Air Operations was shown the Sukhoi 57E, the export version of the fifth-generation Russian supersonic stealth jet fighter and latest from the stable of Mikoyan-Gurevich – the 4++ generation MiG-35.

IAF test pilots Group Captain BS Reddy and Wing Commander FL Roy got an opportunity to fly two sorties on MiG-35 fighter at the show, which is taking part in the fresh tender for the acquisition of 114 fighters by IAF. Talking to Indian press RAC MiG Director General Ilya Tarasenko said it was totally new platform and Moscow was willing to provide



BrahMos Chief Dr Sudhir Kumar Mishra

technology for its production under Make-in-India programme.

MAKS-2019 was inaugurated by President Vladimir Putin with Turkish President Recep Tayyip Erdogan by his side. The Turkish guest showed livid interest in Russian fifth generation stealth jet Su-57E after the threat of ouster from the US-led F-35 programme for buying S-400 Air Defence Missile system from Russia defying the American diktat.

Sanctions weighed heavily on MAKS-2019, however 827 exhibitors from 33 countries, including 184 foreign companies took part in the aerospace show. For the first time China was the foreign partner with an exclusive national pavilion spread over an area of 3,000 sq.m. Although due to ongoing Western sanctions it was again boycotted by major foreign aircraft makers, however the manufacturers of civilian aircraft Airbus 350 and Embraer E-195E2 short-range aircraft in

Tech Lion livery had presented their products for sale in Russia.

The key event of MAKS-2019 was the premiere of the Russian state-of-the-art MC-21-300 medium-haul passenger aircraft. Two aircraft, including the third flying prototype with a passenger cabin, were shown at the static stop. Another prototype took part in the flight program. Four fifth-generation Su-57 fighters awed spectators during the demonstration flights.

Russian Helicopters Holding Company presented a number of novelties, including Kamov Ka-62 medium-size multi-purpose helicopter shown in flight for the first time, as well as the first mass-produced Mi-38 helicopter with a luxury cabin. The Ansat helicopter was demonstrated with the VIP cabin, developed in partnership with the producers of presidential limousines Aurus.

– Vinay Shukla



With Afghan peace deal almost done, it's important for India to get busy with its involvement, both on the ground in Kabul, in world capitals, and among the Taliban. The intra-afghan talks are the key pivot to Afghanistan's future path

US, TALIBAN AFGHAN PEACE DEAL: INDIA'S INCREASED INVOLVEMENT IMPERATIVE TO BUILD ON GOODWILL, PROTECT INTERESTS

By **DR. TARA KARTHA**



So it is almost a done deal. Recent reports indicate that the United States plans to drawdown troops in Afghanistan from about 14,000 to 8,600, which is about a hundred-odd more than the time when President Donald Trump took office. The president will not like that final number as much as he would like 'zero'. As elections in the US draw near, and also probably because of his own understandable convictions about ending the US' 'longest war' — all of 18 years old — troop levels may be reduced to the ultimate round figure if the deal with the Taliban proves effective. As of now, the Pentagon is playing down a withdrawal and promising nothing. Nobody could. This is, after all, Afghanistan, the 'graveyard of empires', whose future is at stake.

India will have to worry about many aspects of the coming deal. In the immediate term, two particular aspects need keeping a wary eye on, given New Delhi's close

relationship to Kabul and its official lack of one with the Taliban. First is the question of the actual contours of the 'deal' that has been reached. It can't yet be even called a 'peace

deal' because even as talks have carried on, Afghanistan went into another paroxysm of violence.

Kabul, as always, is taking the brunt of truck and suicide attacks, even as US personnel continue to be killed. So far, as is apparent, the 'open' deal between the US and the Taliban, has centred around two points: A quick withdrawal of 'foreign troops' (which also includes NATO forces) as a requirement from the Taliban; and for the US a commitment from the Taliban that they will not allow Afghanistan to become a 'safe haven' for terrorists. There are obviously large parts



(Top) Afghanistan peace talks with Taliban (Below) US Deputy Assistant Secretary of State for South and Central Asian Affairs Alice Wells with other officials in Afghanistan Reconciliation (third right) talk with Pakistan's Foreign Affairs Additional Secretary Aftab Khokhar (unseen) at the Foreign Ministry in Islamabad.

of the deal which will remain largely secret, and it seems it will remain 'conditions based', with a considerable number of ifs, buts and wherefores.

With the actual final numbers now out, it seems that the US has acquiesced to the Taliban's demand for a quick exit, starting perhaps even next month. The drawdown itself is going to take a while, with the bearded supremo's told that pulling out some ten thousand troops and their equipment taking probably as much as two years. The actual beginning of the pullout will — hopefully though not certainly — be hinged to the degree of success of the intra-Afghan talks that is actually the core issue and due to take place soon at Oslo.

In simple words, the Taliban and the Afghan government have to sit down and talk. Putting aside all the highfalutin issues such as women's rights, education etc, which is regularly aired in the western media, the actual talks will be on who gets what. In other words, what's it worth for the Taliban to sit down



and talk to a government which has just had the mat pulled out from under its legs.

In a normal negotiating cycle, the announcement of a US pullout should have followed a final decision on power sharing. In sum therefore, President Ashraf Ghani is now like a duck out of water, and without a US force guarding his back his position is worse than shaky. That's not good for India, who has placed Kabul at the centre of its strategy. There is also the obvious question: Is India's relationship to the Palace close

enough to justify its provision of some ten thousand plus troops to shore up his government, if not his life? It is certainly not India's job to bolster a virtual surrender of the US, which has anyway chosen to keep India as a back-bencher through the past year's negotiations. And there's more.

Take a look at what seems to be the Taliban's only commitment, which is that it will not provide shelter to terrorists. But thereby hangs a tale. First, just who is a terrorist in Taliban's eyes? Certainly, it seems to almost

OPINION

THE TALIBAN AND THE AFGHAN GOVT HAVE TO SIT DOWN AND TALK. PUTTING ASIDE ALL THE HIGHFALUTIN ISSUES SUCH AS WOMEN'S RIGHTS, EDUCATION ETC, WHICH IS REGULARLY AIRED IN THE WESTERN MEDIA, THE ACTUAL TALKS WILL BE ON WHO GETS WHAT

viscerally hate the Islamic State of Khorasan (IS-K) which took responsibility for a horrific attack on a wedding party in Kabul recently. But there is more than one Islamic State in Afghanistan.

One operates in and around Kabul, one along the north along Badakshan, and yet another in Nangarhar on the Pakistan border. This last one has seen plenty of fierce fighting between the two. Afghans, however, blame the Taliban for the Kabul attack, and many — including Afghan officials — see this Islamic State segment as a smokescreen for the

Al-Qaeda aren't 'terrorists' either.

At another level are the Lashkar-e-Taiba/Jamaat-udDawa, Jaish-e-Mohammed and the rest. Given that the Taliban depend on their good offices along the border, and for their fighters in specific districts, they're probably not 'terrorists' either. Perplexing for everyone concerned, India included. Someone had better buy an Afghan thesaurus.

A third aspect that has surfaced in the media is that a draft US-Taliban agreement will probably include the phrase 'Islamic Emirate of Afghanistan'. That would

be a huge coup for the group, which will see it as a recognition of themselves as a legitimate government and which predates the present elected government. So far, Kabul's biggest negotiating point has been just that: that it is the government that the people chose to put in office.

Kabul will go into negotiations with that gun to its head. India's position that all talks should be 'Afghan-led and Afghan owned' might find an unexpected twist. These are Afghans who are going to Norway. As talks go forward, Kabul is going to need all the backing it can get. New Delhi has to get busy, both on the ground in Kabul, in world capitals, and among the Taliban. The intra-afghan talks are the key pivot to Afghanistan's future path.

All in all, the only party celebrating could be the Pakistanis. There will be glowing handshakes for the media on how Islamabad got the US off the hook. Behind the scenes,

But then this is Afghanistan, and nothing is ever that simple



(Clockwise from left) Taliban leadership on the sidelines of US Taliban talks; Taliban terrorists; US special envoy Khalilzad with Taliban leaders and Khalilzad interacting with media

Taliban themselves. So the future of IS-K is uncertain.

Then there is the US' Enemy No 1: Al-Qaeda. Reports indicate that it continues to operate alongside Taliban and probably provides it with funds as well. Given that the Taliban still denies that Al-Qaeda was behind 9/11, with no less a person than its spokesman SohailShaheen stating this, it's clear that for the Taliban at least, that





will be other handshakes with the Taliban leaders for having got every one of their demands met — withdrawal, the title, and a virtual recognition of victory — all of which is heady stuff.

First, with a ceasefire virtually on the ground vis-a-vis the US, the Taliban are free to carve out more territory for themselves, and unleash violence on the hapless Afghan forces. That

would annoy US officials no end, including Senator Lindsey Graham among others; he was the one who got Imran Khan his ‘world cup’ joint presser with the US president. He could just as easily make sure Pakistan gets the wrong end of the stick.

So no, it’s not that easy for Islamabad to wriggle out of its commitments this time. Second, there is the possibility that the

whole deal will come apart and Afghanistan will once again fall to a period of bloodletting as in the 1980s. That’s right on Pakistan’s border. The blowback would be immense. That’s not too bad for India, except that it would inevitably get some of that outflow.

Strange to say that both India and Pakistan may have a stake — although for widely different reasons — in ensuring that the intra-Afghan dialogue doesn’t come apart. There is already pressure on Delhi to ‘do more’ at this vital time. So far, Delhi’s USP has been its generous aid, and the good reputation that it brings in its wake.

An increased role has to base itself on this goodwill that Delhi has not only in Kabul, but within some sections of the Taliban. That is the platform to build on. Leave the fighting and cursing to others close by. They’ve been doing it for years. ■

– The author is a Distinguished Fellow at IPCS. Earlier, she was Director, National Security Council Secretariat

THERE IS THE POSSIBILITY THAT THE WHOLE DEAL WILL COME APART AND AFGHANISTAN WILL ONCE AGAIN FALL TO A PERIOD OF BLOODLETTING AS IN THE 1980S. THAT’S RIGHT ON PAKISTAN’S BORDER. THE BLOWBACK WOULD BE IMMENSE. THAT’S NOT TOO BAD FOR INDIA, EXCEPT THAT IT WOULD INEVITABLY GET SOME OF THAT OUTFLOW



GROWING INDO-GULF DEFENCE COOPERATION AND FUTURE PROSPECTS

The historic relations between India and the Gulf countries have undergone a qualitative transformation and has created a new momentum in bilateral ties. The changing nature of the geopolitics in Gulf and South Asia and the increasing confidence among the Gulf nations to develop ties with India, the future of Indo-Gulf defence cooperation looks bright

By **DR. MD. MUDDASSIR QUAMAR**



The historic relations between India and the Gulf countries have undergone a qualitative transformation under Prime Minister Narendra Modi. His ability to engage in active diplomacy with the leaders of the Gulf has created a new momentum in bilateral ties. This is visible from the regular exchange of high level visits to and from the Gulf. Since first becoming prime minister in May 2014, Modi has visited the GCC countries seven times, including thrice to the UAE and once each to Saudi Arabia, Qatar, Oman and Bahrain. The only Gulf country the prime minister has not visited is Kuwait. In addition, Modi has engaged with the Saudi leadership at various multilateral forums, especially the G-20 meetings including latest in Osaka, Japan in June 2019. As reflected in the joint statements issued during the high level meetings, the emphasis is on enhancing business and investment ties and improving security and defence cooperation.

training of officers from the Royal Saudi Armed Forces at Indian defence training institutes and in December 2017 the first group of Saudi cadets joined the three-year training course at the National Defence Academy, Pune.

The two sides have also agreed to begin joint exercises between different branches of the military and it is expected to be operationalised soon. During the visit of Saudi Crown Prince

GROWING DEFENCE COOPERATION

SAUDI ARABIA

India and Saudi Arabia first signed a MoU on defence cooperation in February 2014 when then Crown Prince and Defence Minister (now King) Salman bin Abdulaziz al-Saud visited India paving the way for greater engagement between the security agencies and militaries of the two countries. The desire for improving defence cooperation was re-emphasised during Prime Minister Modi's visit to Riyadh

in April 2016 and Crown Prince and Defence Minister Mohammed bin Salman's visit to New Delhi in February 2019. As per the MoU, India and Saudi Arabia have formed a Joint Committee on Defence Cooperation (JCDC) and it held its fourth meeting in Riyadh in January 2019. Further, delegation level visits have taken place between the two armed forces in 2018. As a step towards improving military-to-military ties, India and Saudi Arabia agreed for



in February 2019, New Delhi and Riyadh “agreed to cooperate and collaborate in joint defence production of spare parts for Naval and Land systems as well as supply chain development.” Moreover, maritime security is considered a significant aspect of defence cooperation and the two sides have agreed to “work together with other Indian Ocean Rim Countries” to ensure security in the Indian Ocean and Arabian Sea. The Indian navy and coast guards hold regular interactions with their counterpart and Indian Naval Ships often undertake port calls to Saudi Arabia. In February 2018, India’s Chief of the Naval Staff Admiral Sunil Lanba visited the kingdom to discuss expanding maritime security cooperation and furthering of ties between the two navies.

UAE

Defence cooperation has emerged as a key area of the growing bilateral ties between India and the UAE. It has emerged as a focus area with the renewal of the MoU on defence cooperation in 2014 and the formation of the Joint

Defence Cooperation Committee (JDCC) that has held regular meetings since. In January 2017, India and the UAE signed another agreement for cooperation in the field of defence industry. This has led to the participation of an Indian delegation led by Minister of State Subhash Bhamre in the International Defence Exhibition (IDEX) in Abu Dhabi in February 2017. Subsequently, a UAE delegation visited India to participate in Defence Expo in April 2018 held in Chennai. In October, a delegation led by Minister of State for Defence Affairs Mohammed al-Flasi visited India and called on then Defence Minister Nirmala Sitharaman to discuss state of defence and security ties. The two sides have agreed to develop defence cooperation to include regular joint exercises, exchange of visits by military officials and explore possibilities for cooperation in the area of defence manufacturing and space exploration.

Maritime security is an important area of mutual cooperation and Indian naval and coast guard ships go on regular port calls to the UAE.

In March 2018, India and the UAE navies conducted the first joint naval exercise “Gulf Star I” off the UAE coast. In May-June 2016, the Air Force of the two countries conducted the second joint exercise “Desert Eagle II” at the Al-Dhafra Air Base in Abu Dhabi. In December 2017, a delegation of the Air Force and Air Defence of UAE visited New Delhi “to discuss logistics and technology cooperation aspects related to air force equipment.” Furthermore, the UAE, along with Saudi Arabia, has emerged as India’s preferred partner in the Gulf for cooperation in counter-terrorism with better intelligence sharing and coordination between enforcing agencies.

OMAN

Oman is the first GCC country with which India established a robust defence cooperation. The most important aspect of this cooperation is maritime security. Oman’s geostrategic location at the mouth of Persian Gulf and Arabian Sea makes it inevitable for guarding the SLoCs in the Indian Ocean. India and Oman have been cooperating in the area of anti-piracy operation in the Indian Ocean for a long time. Oman provides berthing facilities for Indian warships patrolling the Indian Ocean and Arabian Sea. Expanding the cooperation in this field, India and Oman signed an annex to the existing MoU on military cooperation to allow Indian warships to have access to the Duqm Port and use its facilities for maintenance of its military vessels. This will allow India to enhance its naval activity in the Indian Ocean region, significant given growing Chinese naval activity in the Indian Ocean region.

India - Oman defence cooperation have traditionally

THE UAE, ALONG WITH SAUDI ARABIA, HAS EMERGED AS INDIA'S PREFERRED PARTNER IN THE GULF FOR COOPERATION IN COUNTER-TERRORISM WITH BETTER INTELLIGENCE SHARING AND COORDINATION BETWEEN ENFORCING AGENCIES



India-Saudi Arabia ties have grown over the last two decades

DEFENCE COOPERATION



(Top) UAE gives highest civilian honour to Prime Minister Narendra Modi; PM Modi with his Bahraini counterpart Prince Khalifa bin Salman Al Khalifa, at Manama, Bahrain

extended beyond the maritime domain. A number of Omani cadets and officers have been trained in India's National Defence Academy and all three branches of the armed forces — the army, air force and navy — of India and Oman conduct joint exercises. In March 2019, the Indian Army and Royal Army of Oman conducted the third edition of joint exercise Al-Nagah in Oman. In January 2017, the five-day joint exercise Eastern Bridge between two air forces was conducted in Jamnagar, Gujarat, while the two navies conducted the 11th edition of joint naval exercise

Naseem Al Bahr off the coast in Muscat in December 2017. Regular exchanges of high level visits including in September 2018 by the Omani minister responsible for defence affairs, Bader bin Saud al-Busaidi, underline the expanding defence ties. In May 2016, Defence Minister Manohar Parrikar had visited Muscat to discuss security and defence ties and signed four MoUs for cooperation in the sector.

BAHRAIN

In addition to Saudi Arabia, UAE and Oman, Bahrain is another

GCC country with which India has defence ties. Though this is mainly focussed on internal security areas and not between the two militaries. The deputy NSAs of the two countries have been holding "security dialogue" at regular intervals to have better coordination in the fields of cyber security, combating terrorism and countering radicalism. The two sides have expressed interest in developing ties in space technology and maritime security. Bahrain though tiny in size is significant because of the presence of the US Navy's Fifth Fleet which is key to the security of the Persian Gulf vital for India's energy security.

LOOKING AHEAD

There are three key aspects where there is scope for further strengthening cooperation. Firstly, given the growing tensions in the Gulf and the impending security threats, India has been forced to send its Naval Ships to accompany its oil and cargo carriers. This requires regular cooperation and exchanges with the Gulf countries as well as better understanding with the US Navy which has a strong presence in the region. The key is to have a regular exchange of ideas with Saudi Arabia and the UAE as well as Iran for better understanding of the security situation in the region and also safeguard India's interest in this vital region. Growing military cooperation is key for India to better secure its interests in the region.

Secondly, there is significant scope for widening the military-to-military ties, especially with Saudi Arabia. The key is to enhance confidence between the two militaries and this can develop through regular exchanges of military delegation



PM Modi with Omanese leader Sultan Qaboos

and increased interactions among defence officials and security analysts. The most important aspect is to have a better understanding of each other's threat perceptions. The planned joint exercises need to begin sooner while the existing exercises need to be expanded. There is immense scope in developing ties by inviting Saudi, Emirati and Omani military cadets and officers for training courses in Indian military schools.

Thirdly, there are potentials to enhance cooperation in defence manufacturing and exports. Given the nature of security threats in South Asia and Gulf, both India and the Gulf countries import large quantities of defence equipment and weapons from third countries. Given the evolving nature of India's defence industry, the Gulf can be an attractive market. The key would be to showcase manufacturing capacity and develop confidence in the Indian defence industry. To begin with



Maritime Cooperation: India-Oman conduct bilateral naval exercise Naseem-al-bahr

India can start by inviting Saudi and Emirati companies to invest in the Indian defence industry sector and explore the possibility of cooperation with proven international defence companies from third countries to be able to have a more effective partnership.

During meetings with Saudi and Emirati counterparts, Prime Minister Modi has emphasised on the need to develop cooperation in this area within the framework of Make in India, Saudi Vision 2030 and UAE Vision 2021. This requires sustained efforts and investments

but the scope for cooperation is immense given the growing intent and burgeoning needs on both sides. There are some challenges, especially the Pakistan factor, but given the changing nature of the geopolitics in Gulf and South Asia and the increasing confidence among the Gulf nations to develop ties with India, the future of Indo-Gulf defence cooperation looks bright. ■

Note: Views expressed are of the author and do not necessarily reflect the views of the IDSA or of the Government of India.

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EXPANDING THE COOPERATION IN THIS FIELD, INDIA AND OMAN SIGNED AN ANNEX TO THE EXISTING MOU ON MILITARY COOPERATION TO ALLOW INDIAN WARSHIPS TO HAVE ACCESS TO THE DUQM PORT AND USE ITS FACILITIES FOR MAINTENANCE OF ITS MILITARY VESSELS. THIS WILL ALLOW INDIA TO ENHANCE ITS NAVAL ACTIVITY IN THE INDIAN OCEAN REGION, SIGNIFICANT GIVEN GROWING CHINESE NAVAL ACTIVITY IN THE INDIAN OCEAN REGION

ARMY AVIATION MODERNISATION: A REALITY CHECK

Time has now come for the Government to take some hard decisions to modernise Indian Army in general and Army Aviation Corps in particular especially on the ownership issue of attack and medium lift helicopters

By **LT GEN BALLI S PAWAR (RETD)**

Indian Army for the first time put across its requirement for a separate air arm comprising all types of helicopters and limited fixed wing aircraft to the Government in 1963 immediately after the 1962 debacle. This proposal however received little attention and even the Army did not pursue it much due to the overall focus on re-organising and modernising the Indian Military. However, the focus on having a separate air arm for the Army was never lost sight of and the sustained efforts bore fruit on November 1, 1986 when it finally got its own Army Aviation Corps with the transfer of existing assets of Chetak/Cheetah helicopters held in the inventory of its Air Observation Post (AOP) flights, which were under the control of Air Force.

It is however a sad reflection on the Army's modernisation and transformation plans that at the end of 33 years of its birth, the ELITE air arm of the Army continues to fly the outdated, vintage and unsafe fleet of Cheetah/Chetak helicopters inducted in late sixties and early seventies, is

faced with a confused Government policy on ownership of Attack Helicopters (AH), has been denied its legitimate requirements of Medium and Heavy lift helicopters to enhance its tactical lift and special operations capabilities and of course to even think of acquiring fixed wing aircraft for

its communication requirements, seems a distant dream. A 'Reality Check' clearly shows that the growth of this battle winning 'Arm of the Future' has been nowhere near what was envisioned in 1963. Today it lacks the requisite firepower, manoeuvre and assault capability in terms of attack and lifts helicopters.

It will be worthwhile to point out here that all major armies of the world have a suitably equipped and operationally potent air arm (Army Aviation Corps), which have in their inventory not only all types and class of helicopters, to include attack, medium and heavy lift, but also fixed wing aircraft for communications and logistics. In fact, both our adversaries China and Pakistan have a very potent and effective air arm in their respective armies. The Pakistan Army Aviation has in its inventory the likes of Mi-17 and Chinook helicopters in the medium/ heavy lift category and the MI-25/MI-35 and Huey Cobras in the armed/ attack helicopters category. The latest reports indicate that Pakistan has signed a contract with Turkey for the acquisition of 30 x T129 ATAK state of art attack helicopters being manufactured indigenously in Turkey, under



DRDO successfully test fires Nag ATGM



Indian Army
Cheetah Helicopter



IAF gets AH-64E (I) Apache helicopters from Boeing

licence from Italy's Augusta Westland – the A129 ATAK is based on Augusta Westland's A129 Mangusta attack helicopter model. This certainly leaves one wondering why the 1.3 million strong Indian Army, the third largest in the world is still fighting turf battles and justifying its requirement to suitably equip and arm its air arm, in order to exploit its full potential in future conflicts.

However despite the above there has been some significant forward movement in Army Aviation Corps modernisation thrust in the recent past. Firstly, the Government's clearance for acquisition of six state of art Apache Longbow AH for the Army, though initially 11 were approved and secondly, the long awaited forward movement on the Ka-226T light observation helicopters project, for replacement of the outdated Chetak and Cheetah helicopters. The most significant development in the Army Aviation's growth plan has been the induction of the HAL made ALH-Dhruv helicopters in 2002. The Army Aviation Corps was the first to induct these indigenously developed machines and today has an inventory of



HAL's Light Combat Helicopter

approximately 80-90 Dhruv's - this fleet is expected to grow further in the coming years.

REALITY CHECK

Presently the Army has in its inventory the largest number of helicopters among the three services (300 plus), majority being the light observation class (Cheetah and Chetak). These helicopters are obsolete and have been in service for more than 40 years. Keeping this fleet operational itself is becoming well-nigh impossible due to its vintage and spares non availability/criticality, a fact accepted and corroborated by both Hindustan Aeronautics Ltd and the Army. The 'Cheetah' helicopter (upgraded Cheetah) fielded by

HAL as an interim measure is not a satisfactory solution for the long term as the basic technology remains old and outdated – it basically has a more powerful engine with an upgraded gearbox to absorb the additional power, but the airframe and numerous other features remain the same.

In the light utility category, while the induction of the ALH/Dhruv is making steady progress as brought out earlier, there are serious serviceability and maintenance issues which need to be addressed by the HAL on priority, to ensure optimal utilisation of this fleet especially in high altitudes. However, the heavy and medium lift helicopters which form the core of the Army's tactical lift capability and bulk of attack

A 'REALITY CHECK' CLEARLY SHOWS THAT THE GROWTH OF THIS BATTLE WINNING 'ARM OF THE FUTURE' HAS BEEN NOWHERE NEAR WHAT WAS ENVISIONED IN 1963. TODAY IT LACKS THE REQUISITE FIREPOWER, MANOEUVRE AND ASSAULT CAPABILITY IN TERMS OF ATTACK AND LIFTS HELICOPTERS

ANALYSIS



HAL Rudra

helicopters remain with the Air Force – their optimum operational employment is not possible in the present set up. It is ironic that even the Armed Police Forces like the Border Security Force have a full fledged air arm which has in its inventory the latest version of the Mi-17V5 helicopters.

The Army’s requirement of small fixed wing aircraft (Dornier Class), in limited numbers for roles like command and control, aerial communication hubs, logistics including casualty evacuation and communication flights has also not fructified – one unit per operational command has been planned. This despite the fact that even the Coast Guard and Border Security Force have fixed wing aircraft in their inventories.

FUTURE PERSPECTIVE

The Government’s decision to go in for the induction of 200 Russian Ka-226T helicopters in a Government to Government agreement is a welcome step and move in the right direction. However the progress on this crucial project has been tardy to say the least. Even four years after the agreement between the two Governments at the level of President Putin and Prime Minister Modi, the contract has

still not been signed. HAL is the nodal agency along with Russian Helicopters for this project and as per the agreement, 60 helicopters will be delivered in a fly away condition while the balance 140 will be manufactured in India at HALs new facility at Tumkur in Karnataka. The contract was to be signed last year but there seems to have been no progress on the same to date highlighting India’s lethargic approach to the defence equipment acquisition process, even when it is critical.

Simultaneously, HAL has also undertaken the development and manufacture of a three tonne class light utility helicopter (LUH). This is to cater to the light reconnaissance & observation class of helicopters for all three services. As per HAL, the LUH is expected to complete flight certification and go into

production soon. The plans are to manufacture 184 LUH in the new helicopter complex in Tumkur, Karnataka. Overall there is requirement of almost 500 helicopters of the light observation class, with Army’s requirement amounting to approximately 280-300, which includes the replacement of Chetak/Cheetah.

In the utility/lift category the induction of indigenously manufactured ALH commenced in 2002. Since then 80 helicopters have been inducted and operationalised and another 60-70 are planned for induction in the coming decade-these helicopters will provide tactical lift capability at the level of Corps.

Another variant of the ALH is the armed version called the ‘Rudra’, which was officially handed over to the Army during the Aero India show in February 2013 – three units are already operational and another under raising. Rudra is a typical armed helicopter with an array of weapon systems including gun, rockets, air to air missiles (French Mistral) and air to ground missiles, along with a modern sighting system and integrated electronic warfare self – protection suite. However, in its present configuration it has not been integrated with a suitable ATGM, as the air version of Nag ATGM ‘Helina’, being developed by the Defence Research and Development



Kamov Ka-226T

Organisation (DRDO) is not yet ready. It is pertinent to note that non availability of a suitable airborne ATGM will not only impact the operational capability of the Rudra but also the Light Combat Helicopter (LCH) project of HAL. The ATGM is the main weapon system of an armed/attack helicopter and without it the helicopter merely remains a gunship, inhibiting the exploitation of its full potential. This is an area of grave concern and needs to be addressed on priority by all stakeholders concerned – all previous efforts to acquire a suitable ATGM export have come to a naught and DRDO has been grappling with this project for the last two decades with no concrete results to show even today.

The Army is also looking to acquire a suitable helicopter in the 10-12 tonne class with stealth features for its Special Operations Units, as well as enhancing its overall tactical lift capability. The HAL has been looking at the feasibility of a joint venture with a foreign vendor for a 10-12 tonne class multirole helicopter whose variants would also be available to the Navy and Air force. Barring the mock-up shown in Aero India-2017 there is no progress in sight.

With the decision of the MoD on the ownership issue of attack helicopters in Army's favour in 2012, the Army had projected its own requirements of attack helicopters – 39 Apache Mk III for its Strike Corps. While initially 11 Apaches were cleared by the Government for the Army, based on the tactical and operational requirements of an attack helicopter unit, its recent decision to cut this down to only six Apache's has left many military aviation professionals baffled – the employment philosophy of attack helicopters does not justify such numbers, though on



Indian Air Force Dhruv

the positive side this will give the Corps the requisite experience to operate and maintain these state of art machines. While there is no doubt that the 22 Apaches being inducted into the Air Force will also be operationally available to the Army during conflict, the Government needs to address and clarify the ownership issue at the earliest – eight Apaches have already been inducted into the Air Force. The Army Aviation will get its Apaches after the 22 have been delivered to the Air Force.

The development of the LCH by HAL is indeed a landmark achievement for the LCH is a state of art attack helicopter with capability to operate at high altitudes (16000 feet) and would meet the unique requirements of the Indian Army in the mountains. The LCH uses the technology of the existing ALH and its configurations except that the fuselage is suitably modified and streamlined for tandem seating. Four prototypes of the LCH have completed pre-induction trials and in January this year HAL declared that the LCH is ready for operational induction after completing all weapon integration tests. The Defence Acquisition Council (DAC) has already cleared the limited series production (LSP) of 15 LCH, 10

for the Air Force and five for the Army respectively. The LCH is a multirole combat helicopter with the unique and distinct capability to operate at high altitudes – an advantage over other attack helicopters in the world today.

CONCLUSION

To make the Army Aviation a potent force capable of supporting the Indian Army operations across the entire spectrum of conflict in the Tactical Battle Area, it must have a mix of both helicopters and fixed wing aircraft with helicopters forming the core. The helicopter fleet should consist of attack and armed helicopters, heavy, medium and light utility (lift) helicopters and light observation helicopters. There also would be a need for specialised helicopters suitably modified for special operations. Time now has come for the Government to take some hard decisions in this regard, especially on the ownership issue of attack and medium lift helicopters. With these crucial assets as part of its inventory, the Army Aviation will truly evolve as a potent arm of the Indian Army, whereby its combat potential is enhanced to the maximum. ■

- The author is an Indian Army veteran

WITH ATTACK AND MEDIUM LIFT HELICOPTERS IN ITS INVENTORY, THE ARMY AVIATION WILL TRULY EVOLVE AS A POTENT ARM OF THE INDIAN ARMY WHEREBY ITS COMBAT POTENTIAL IS ENHANCED TO THE MAXIMUM



INDIAN AIR FORCE MARKS 87TH ANNIVERSARY OF GLORIOUS JOURNEY

Apart from securing the defence of its borders, the IAF has also been playing a key role in providing humanitarian assistance ranging from rescuing pilgrims in Kedarnath to disaster relief to the floods victims in Chennai and Kerala

By **SRI KRISHNA**

New Delhi. As Indian Air Force (IAF) on October 8 celebrates 87th anniversary of its establishment on this day in 1932, the air warriors have proved their mettle numerous times and fulfilled duty of providing aerial security to the hilt. One of the key components of the Indian defence mechanism, the Indian Air Force (IAF) stands at number four in list of the strongest Air Force in the world following US, Russia and Israel at top three positions. With about 1.7 lakh of personnel and about 1500 aircraft, Indian Air Force stands ahead of the Royal Air Force of the United Kingdom, China, France and other nations.



The air warriors have played a key role in the nation's defence since Independence warding off in 1947 the Pakistan-backed raiders in Kashmir, the three wars against Pakistan in 1965, 1971 and the Kargil war of 1999.

Keeping pace with the demands of contemporary advancements, the IAF continues to modernise in a phased manner and today it stands as a credible air power counted among the foremost professional services in the world.

Even as the IAF reach has improved considerably as was seen during various exercises such as Gagan Shakti (April 8 to 22, 2018) when the Su-30 MKI, flying from the Eastern airbases, was able to fly across the country and 'attack' targets in the Arabian Sea more than 2500 km away and recover at a base in Southern India, covering a total distance of more than 4000 km, yet the need of the hour is to increase



MiG-21



Mi-8



MiG-27

its squadron strength and fire power.

However, even though time and again the IAF has proved its capability yet it becomes imperative that while considering the defence preparedness of the armed forces, adequate consideration be given to ensure that the Air Force remains a potent force, not only as a strong deterrent able to effect punishment on a wayward enemy, but also maintain the

required 'dissuasive' posture against an adversary that is modernising its Air Force at a galloping pace. The present manning level of the IAF is a cause for concern. With only 31 squadrons at present, and the likelihood of winding down of all MiG-21 and MiG-27 squadrons by 2024, the IAF would be in a precarious position.

The slow pace of production of the LCA does not give reassurance to the IAF that stares at depletion

TO ENSURE THAT THE IAF – AS THE PRIMARY INSTRUMENT OF MILITARY DIPLOMACY AND MILITARY COERCION – REMAINS ADEQUATELY POTENT, THERE IS NEED TO TAKE AMPLE MEASURES TO ENSURE THAT THERE IS NO FURTHER DEPLETION OF THE NUMBER OF SQUADRONS FROM THE EXISTING 31, AND AFTER THAT A GRADUAL BUILD-UP TO 42 SQUADRONS BY 2032

to its fighter fleet in the next six to eight years. And numbers are important.

To ensure that the IAF – as the primary instrument of military diplomacy and military coercion – remains adequately potent, there is need to take ample measures to ensure that there is no further depletion of the number of squadrons from the existing 31, and after that a gradual build-up to 42 squadrons by 2032.

Clearly keeping this in view, the government has focused



AIR FORCE DAY SPECIAL



**INDIA AND THE UNITED STATES
CONCLUDED A \$2.2 BILLION CONTRACT
FOR 22 AH-64ES AND 15 CH-47F CHINOOK
HEAVY-LIFT HELICOPTERS FOR SERVICE IN
THE IAF IN SEPTEMBER 2015**



on purchase of the Rafale jets from France despite the massive uproar that was kicked up when Prime Minister Narendra Modi made the announcement during his visit to France of the purchase of 36 jets with the Defence Minister Rajnath Singh

taking possession of the first coinciding with the Air Force day celebrations.

As part of its modernisation programme, the IAF formally inducted into service the Boeing AH-64E Apache Guardian attack helicopter at Pathankot air base in Punjab near the India-Pakistan border on September 3.

It took delivery of the first eight AH-64E helicopters in July and August 2019 at Hindan Air Force Station (AFS) in Ghaziabad outside New Delhi. The first AH-64E was officially handed over to the IAF during a ceremony at Boeing's production center in

Mesa, Arizona, in May.

The helicopters will serve with the IAF's 125 Helicopter Squadron (125 H SQUADRON) deployed at Pathankot. A second AH-64E squadron will be stood up at Jorhat air base in Assam in northeastern India near the Sino-Indian border.

India and the United States concluded a \$2.2 billion contract for 22 AH-64Es and 15 CH-47F Chinook heavy-lift helicopters for service in the IAF in September 2015. The contract combines a direct commercial sale with Boeing and a Foreign Military Sales (FMS) agreement with the



Mi17 V51



CH-47 Chinook



Sukhoi Su-30 MKI

U.S. Department of Defense.

The IAF has a massive demand on its wish list for making critical purchases running into billions of dollars. These include 114 new medium-weight fighter planes, 83 light combat aircraft, a mix of 33 more MiG-29s and Sukhoi-30s, six aerial refueling planes, 56 new medium transport aircraft and 70 basic trainer aircraft.

Over the years the IAF has grown from a tactical force to one with transoceanic reach. The strategic reach emerges from induction of Force Multipliers like Flight Refuelling Aircraft (FRA), Remotely Piloted Aircraft

(RPA) and credible strategic lift capabilities. Besides, the IAF has also been focusing on acquiring best of technology through acquisitions or upgradation, be it aircraft, systems, precision missiles or net centricity.

In recent years, the IAF has started upgrading its combat aircraft fleet to enhance its operational capability and maintain its aircraft as modern weapon platforms, capable of meeting the present challenges posed by the security scenario in the region. Of the available fleet, MiG-21, MiG-27 and Jaguar aircraft have already been

upgraded and Mirage-2000 and MiG-29 aircraft are planned for upgradation. The Indian Air Force is considering upgrade of its medium lift helicopters comprising Mi-8, Mi-17 and Mi-17-IVs, as also the AN - 32 transport aircraft, with the aim of improving their overall capability.

The IAF today is in the process of a most comprehensive modernisation plan. Over the next few years, the force would induct more Su-30 MKI aircraft, the Light Combat Aircraft (LCA) and the Medium Multi Role Combat Aircraft (MMRCA).

AIR FORCE DAY SPECIAL



C-130J Super Hercules

EVER SINCE ITS FIRST FLIGHT ON APRIL 1, 1933, THE IAF HAS INDEED COME A LONG WAY PROVIDING THE MUCH NEEDED AIR SUPPORT TO INDIAN TROOPS AND ALSO CREATING RECORD OF SORTS BY ESTABLISHING THE HIGHEST AIR FORCE STATION ON THE SIACHEN GLACIER AT A HEIGHT OF 22,000 FT (6,706 M)



There are plans to augment the helicopter and transport fleets too. The IAF is also in the process of acquiring radars in various categories to meet the Air Defence requirements, accurate and advanced weapons, Network Centric Warfare systems to meet its assigned tasks.

Ever since its first flight on April 1, 1933, the IAF has indeed come a long way providing the much needed air support to Indian troops and also creating record of sorts by establishing the highest Air Force Station on



AH-64E Apache



Boeing C17 Globemaster

the Siachen Glacier at a height of 22,000 ft (6,706 m).

The Air Warriors also created a world record by performing the highest landing of a C-130J at Daulat Beg Oldi (DBO) airstrip in Ladakh at the height of 16,614 feet (5065 meters).

The IAF is the only air force that operates C-17 Globemaster III, C-130J Super Hercules, and Il-76 – the three largest transport aircrafts.

Apart from securing the defence of its borders, the IAF has also been playing a key role in humanitarian assistance ranging from rescuing pilgrims who were stranded in Kedarnath in the worst natural disaster and the floods in Chennai and in Kerala.

In Operation Rahat (“Relief”), the Indian Air Force rescued thousands of pilgrims in transit in the hill states of Uttarakhand and



IAF likely to have Medium Multi Role Combat Aircraft (MMRCA) in next few years

Himachal Pradesh stranded in various valleys. It was one of the largest operations of the Indian Armed Forces in several decades and IAF claims it to be the biggest civilian rescue operation in the world carried out by any air force using helicopters. The IAF also has its very own museum in

New Delhi with a rich collection of memorabilia of Indian Military Aviation and displays the history of the Indian Air Force. It has some rare memorabilia of the Indian Air Force since it was formed in 1932. ■

– The author is a senior journalist and media consultant.



INDIAN AIR FORCE @ 87: NEED FOR TRANSFORMATIONAL STRATEGIES

With the taking over of new Chief having strong background in technology and research as a Test Pilot, IAF is expected to play a strong leadership role in directing and controlling various development programmes efficiently



Mirage 2000

By **AIR MARSHAL M MATHESWARAN AVSM VM PhD (RETD)**

Come this October 8, the Indian Air Force (IAF) would be completing 87 momentous years since its inception in 1932. Starting with just a few aircraft in 1932, the IAF has grown to become one of the largest and most powerful air forces of the world. The past year has seen the IAF witness few momentous events and major strategic milestones being established. The top event is easily the one of February this year. By carrying out an aerial strike on targets in Balakot in Pakistan, the IAF and India's political leadership broke free of its long held self-restraint in response to terrorist attacks and provocations from Pakistan.

This was indeed a major strategic shift on India's part, and from now on the rules of the game are permanently altered. Pakistan will now have to content with an India that is ever ready to use its air power in any situation of unprovoked interference and cross-border terrorism.

The second aspect relates to some of the long-delayed inductions bearing fruit. IAF inducted the Apache attack helicopter and the Chinook heavy-lift helicopter, giving a boost to its attack and heli-lift capabilities. The long awaited first Rafale aircraft was handed over to the IAF in September. The first squadron should be completed in 2020. Indigenous Tejas aircraft began gathering some pace in induction, although it is still far short of the desired production rate. However, these are welcome developments for the IAF, which is beleaguered by falling force strengths for more than a decade.

Two more important developments/occurrences in the last two months will have critical bearing on the future of the IAF in terms of operational strategies and force structures. The first

relates to Prime Minister's August 15 announcement of his decision to appoint a Chief of Defence Staff (CDS). This announcement is clearly a pointer towards recognising the primacy of 'Joint Operations' philosophy. It is to be noted here that the IAF will need to take a lead role in defining and articulating the critical role and importance of aerospace power in the prosecution of joint operations and future wars. With its ability to dominate air, space, and cyber dimensions by virtue of networked forces, an ISR capability that will create near real-time situational awareness, inherent ability for rapid and flexible force application, precision, and reach,



Balakot in PoK



LCA Tejas (Air version)

WITH ITS ABILITY TO DOMINATE AIR, SPACE, AND CYBER DIMENSIONS BY VIRTUE OF NETWORKED FORCES, AN ISR CAPABILITY THAT WILL CREATE NEAR REAL-TIME SITUATIONAL AWARENESS, INHERENT ABILITY FOR RAPID AND FLEXIBLE FORCE APPLICATION, PRECISION, AND REACH, THE IAF WOULD BE CRITICAL IN JOINT OPERATIONS AT ALL LEVELS – TACTICAL, OPERATIONAL, AND STRATEGIC

the IAF would be critical in joint operations at all levels – tactical, operational, and strategic. The second development is even more significant for India.

Houthi rebels' drone attack of September 14 on Saudi Arabia's oil refineries exemplified the emerging effectiveness of asymmetric strategies against high-cost, high-tech defences. The attack, using ten low cost drones (at not more than 15000 US dollar in total), reduced Saudi Arabia's oil production by 50 per cent resulting in rapid rise in global oil prices. It would take months for Saudi Arabia to repair the damages to its refineries, and the losses could be in billions of dollars. In 2017, a three million US dollar Patriot

missile was used to neutralise the possible threat posed by a 200 US dollar quadcopter drone. Quite clearly, low cost drones with high-tech, artificial intelligence infused control systems, and plastic explosives in the hands of insurgents, non-state actors, and unstable states would pose major threats to strategically important targets. Like major air forces, the IAF will need to take a hard look at their strategies in evolving effective counter UAV strategies alongside the current focus on high-tech, high-cost, weapons platforms and sensor systems. The need to strike an appropriate balance that ensures affordable, cost efficient, futuristic and operationally viable force

compositions is extremely important.

The government must realise that the IAF's force structure needs to be fully addressed to achieve conventional and nuclear deterrence. IAF's force structure and combat capabilities are critical elements of the country's ability to achieve conventional deterrence. The air force has its task cut out. IAF's immediate priority is to convince the government for quick inductions to rebuild its declining force structure. While two squadrons of Rafale would add immense teeth to the existing capability, its requirements far exceed this induction. It needs immediate replacements for its old fighter aircraft such as the



AIR FORCE DAY SPECIAL

MiG-21s, and MiG-27s. Besides, replacements for MiG-29s, Jaguars, and Mirage 2000s over the next decade and a half need to be planned now. Replacements will need to factor affordability and emerging disruptive technologies. Development of UAVs and UCAVs, as also asymmetric strategies are important. LCA induction will need to be accelerated as also the upgrade of the Su-30 fleet.

It is in the 'systems of systems' domain where the IAF needs to pay urgent attention. Its efforts to accelerate its capability development have not been very successful so far. Its Net-centric Warfare capability is only partially in place. While integration of its radars through the Integrated



LIKE MAJOR AIR FORCES, IAF NEEDS TO TAKE A HARD LOOK AT THEIR STRATEGIES IN EVOLVING EFFECTIVE COUNTER UAV STRATEGIES ALONGSIDE THE CURRENT FOCUS ON HIGH-TECH, HIGH-COST, WEAPONS PLATFORMS AND SENSOR SYSTEMS

Air Command and Control (IACCS) system is operational, its airborne datalink capability is far from reality. For a project that began in 2005 and completed a successful pilot project in 2013, the 'Operational data Link' is yet to take off. Major problems have been related to the failure to induct and operationalise the software defined radio (SDR), which forms the crux of the NCW capability. There is little doubt that the NCW capability solutions must be completely indigenous for reasons of national security.

The IAF is yet to drive the project as a leader. Unless this program management is fully driven by the IAF, India may miss the boat on these technologies completely. Similarly a very robust C4ISR system is essential. This has great relevance from a joint operational perspective. The IAF's leadership in these programmes is crucial.

It is well known that much of IAF's force structure (almost 90 per cent) is import dependent. To continue in such a state would make mockery of India's aspirations to be a



MiG-21



Rafale fighter jet



Former Air Chief BS Dhanoa inspecting Apache helicopter after the handing over to IAF

WITH THE TAKING OVER OF NEW CHIEF HAVING STRONG BACKGROUND IN TECHNOLOGY AND RESEARCH AS A TEST PILOT, IAF IS EXPECTED TO PLAY A STRONG LEADERSHIP ROLE IN DIRECTING AND CONTROLLING VARIOUS DEVELOPMENT PROGRAMMES EFFICIENTLY

great power. Almost all sensors, communications and weapons technologies are import-dependent. India's indigenisation efforts like 'Make in India' have continued to flounder in various formulations of policy and implementation. Unless the user, Indian Air Force, gets fully involved in steering the project by balancing operational necessities and indigenous development and manufacturing, this will continue to be a problem. It is good for the IAF to take charge of the LCA programme in its totality. This involves accelerating the production of LCA Mk1, development and production of LCA Mk 1A and LCA Mk 2. The strategy should not only be in accelerating the production levels, but more importantly to reduce levels of import dependency to less than 30 per cent. LCA is currently 70 per cent import dependent. The Advanced Medium Combat Aircraft (AMCA) should only be taken up when the LCA development processes in different versions and industry capabilities are fully in control.

IAF has done well to concentrate



Su-30 MKI

on drone development strategies, including development of swarming algorithms and control systems. By creating an innovative competitive scheme, and encouraging private sector as well as individual and institutional participation the programme is likely to result in many innovative ideas with significant potential. It is important that the IAF pursues this development carefully and enables it to its logical conclusion. Success of this programme will be a shot in the arm to young innovators and scientists in the country.

With a new Chief of Air Staff who has a strong background in technology and research as a Test Pilot, it is expected that he will steer the IAF to play a strong leadership role in directing and controlling various development programmes efficiently with the strictest accountability towards operational enhancement of the IAF. ■

- The author is a former Deputy Chief of Integrated Defence Staff (Policy, Plans, & Force Development). Currently he is the founder Chairman & President of 'The Peninsula Foundation', a Chennai based think-tank

DEFENCE MINISTER TO RECEIVE FIRST RAFALE AIRCRAFT ON AIR FORCE DAY

New Delhi. Defence Minister Rajnath Singh will receive the first Indian Rafale combat aircraft in France on Indian Air Force Day (October 8). The aircraft manufactured by French firm Dassault Aviation will come to India only next year.

“October 8 is auspicious for two reasons. It is both Dussehra and Air Force Day on that day,” government sources said.

The Defence Minister will travel along with Defence Secretary Dr Ajay Kumar and other senior officials to receive the aircraft.

As per earlier plans, Balakot operations in-charge and current Air Force Chief, Air Chief Marshal BS Dhanoa was to travel to receive the plane from France on September 19-20.

Now, an Air Force team will visit France around the same time and sign documents with the French government after which the Indian pilots will start training on the advanced Indian Rafale planes.

“Once they start training, they may also fly the aircraft once the Defence Minister and his team reach the location near Bordeaux,” sources said.



IAF WANTS RS 40,000 CRORE FOR MODERNISATION

New Delhi. With top defence officials repeatedly emphasising on the possibility of a two-front war and the need to have an airpower capable of dealing with such a scenario, it has sought the need for massive funds for its modernisation.



Keeping this in view, the IAF has sought Rs 40,000 crore from the Government for procuring latest weapons even as it faces a severe cash flow problem. It has sought additional money from the Government to buy new equipment and also pay for weapons and systems it has already contracted to purchase.

The capital expenditure of Rs 39,300 crore earmarked for IAF in this year's budget is not enough to upgrade capabilities and more money needs to be pumped in to avoid a funding crisis with least Rs 40,000 crore more needed to pursue its modernisation.

“There's a worrying mismatch between our requirements and the money allocated for it. We have asked the government to provide more funds. We have been told that IAF's demand will be looked into at the revised estimate stage in December,” official sources said. The IAF has a massive demand on its wish list for making critical purchases running into billions of dollars. These include

114 new medium-weight fighter planes, 83 light combat aircraft, a mix of 33 more MiG-29s and Sukhoi-30s, six aerial refueling planes, 56 new medium transport aircraft and 70 basic trainer aircraft.

“Apart from buying new platforms, we also have to make payments for those that were contracted earlier and are in the process of being inducted. The IAF has a committed liability of Rs 48,000 crore,” official sources said. Orders have already been placed for multi-billion dollar weaponry and systems that the air force has to pay for which include 36 Rafale fighter planes from France, five S-400 Triumf air defence missile systems from Russia and 22 Apache AH-64E attack helicopters and CH-47F Chinook heavy-lift helicopters from the United States. India defence budget for 2019-20 stands at Rs 3.18 lakh crore, including a capital outlay of just Rs 1.04 lakh crore. India's defence spending currently stands at around 1.5 per cent of gross domestic product (GDP), the lowest in decades. ■



MORE TEETH TO IAF WITH INDUCTION OF APACHE AH-64E HELICOPTERS IN ITS INVENTORY

shoot fire and forget anti tank guided missiles, air to air missiles, rockets and other ammunition, it also has modern EW capabilities to provide versatility to helicopter in a network centric aerial warfare. Apaches have been an integral part of numerous historic campaigns worldwide. These aircraft have been modified

specifically to suit the exacting standards demanded by IAF. I am happy to note that the delivery schedule is on time with eight helicopters already being delivered.”

IAF has signed a contract with ‘The Boeing Company’ and US Government for 22 Apache Attack Helicopters. The first eight helicopters have been delivered on schedule, and the last batch of helicopters is to be delivered by March 2020. These helicopters will be deployed in the Western regions of India.

The helicopter is capable of delivering variety of weapons which include air to ground Hellfire missiles, 70 mm Hydra rockets and air to air Stinger missiles. Apache also carries one 30 mm chain gun with 1200 rounds as part of area weapon sub system. To add to the lethality of the helicopter, it carries fire control radar, which has 360° coverage and nose mounted sensor suite for target acquisition and night vision systems.

The addition of Apache Attack Helicopter is a significant step towards modernisation of Indian Air Force helicopter fleet. This procurement will enhance the capability of IAF in providing integrated combat aviation cover to the army strike corps. These tandem seating helicopters can operate day and night, all weather capable and have high agility and survivability against battle damage. These are easily maintainable even in field conditions and are capable of prolonged operations in tropical and desert regions. ■

New Delhi: Indian Air Force (IAF) on September 3 took a major step towards boosting its combat capability with the induction of AH-64E Apache Attack Helicopter into its inventory at a function at Air Force Station Pathankot where Air Chief Marshal BS Dhanoa, Chairman Chiefs of Staff Committee (COSC) and Chief of the Air Staff (CAS) was the Chief guest.

Speaking on the occasion, Air Chief Dhanoa said “Apache attack helicopters are being purchased to replace the Mi-35 fleet. Alongside the capability to

IAF GETS BOOST WITH SECOND “NETRA” AEW AND CS

New Delhi. India’s air power got a big boost with the Defence Research and Development Organisation (DRDO) handing over the second Netra Airborne Early Warning and Control System (AEW&CS) system to the Indian Air Force (IAF).

It comprises an indigenously developed AESA radar mounted on an Embraer 145 aircraft and was handed over to the Western Air Command Chief at the Bhatinda air base.



The aircraft will help India address its capability asymmetry with China and Pakistan in this crucial area of modern warfare. The Netra

system had earlier helped India plan and execute the Balakot airstrikes deep within Pakistani territory.

The system will also help complement the three Israeli Falcon AEW&CS systems in the IAF fleet, with reports of Indian plans to induct two more AEW&CS systems. According to estimates, India needs at least 20 of such surveillance systems to develop adequate defensive and offensive capability as the IAF guards the Eastern and Western fronts. ■

AIR MARSHAL RKS BHADAURIA APPOINTED IAF CHIEF

Known to be instrumental in India-France Government-to-Government Rafale deal under which India will get two squadrons of the fighter jet, Air Marshal Bhadauria took over the reigns of Indian Air Force days before when the Force is all set to mark 87th anniversary



New Delhi. Air Marshal RKS Bhadauria has been appointed the new chief of Indian Air Force (IAF). The announcement to this effect was made by the Government on September 19. Prior to taking the new assignment as IAF chief, Air Marshal RKS Bhadauria was the Vice Chief of Air Staff (VCAS). He took over the IAF reigns on the superannuation of incumbent Air Chief Marshal BS Dhanoa on September 30.

Air Marshal Bhadauria was commissioned into the Fighter Stream of Indian Air Force in June 1980, and has held various Command, Staff and Instructional Appointments at various levels including the present one as Vice Chief of Air Staff (VCAS). Air Marshal Bhadauria was also due to retire on the same day as Air Chief Marshal Dhanoa. But now that he has been appointed as the chief of Air staff, he will serve a three-year term or till the age of 62, whichever is sooner. In this case, his term will be of two years.

He is an alumnus of National Defence Academy, Pune. He has clocked over 4250 hours of flying and has experience of 26 different types of fighters. Air Marshal Bhadauria served as Air Officer Commanding-in-Chief (AOC-in-C), Southern Air Command from March 2017 August 2018. He also served as Air Officer Commanding-in-Chief (AOC-in-C), Training Command from August 2018 and held the office till his elevation to the Vice Chief of the Air Staff in May this year.

During his career, Air Marshal



Bhadauria has been recipient of Presidential awards of Ati Vishisht Seva Medal (AVSM), Vayu Sena Medal (VSM) and Param Vishisht Seva Medal (PVSM). He was appointed honorary Aide De Campe to the President in January this year.





RE-IMAGINING MAKE IN INDIA IDEAS FOR FUTURE LEAP

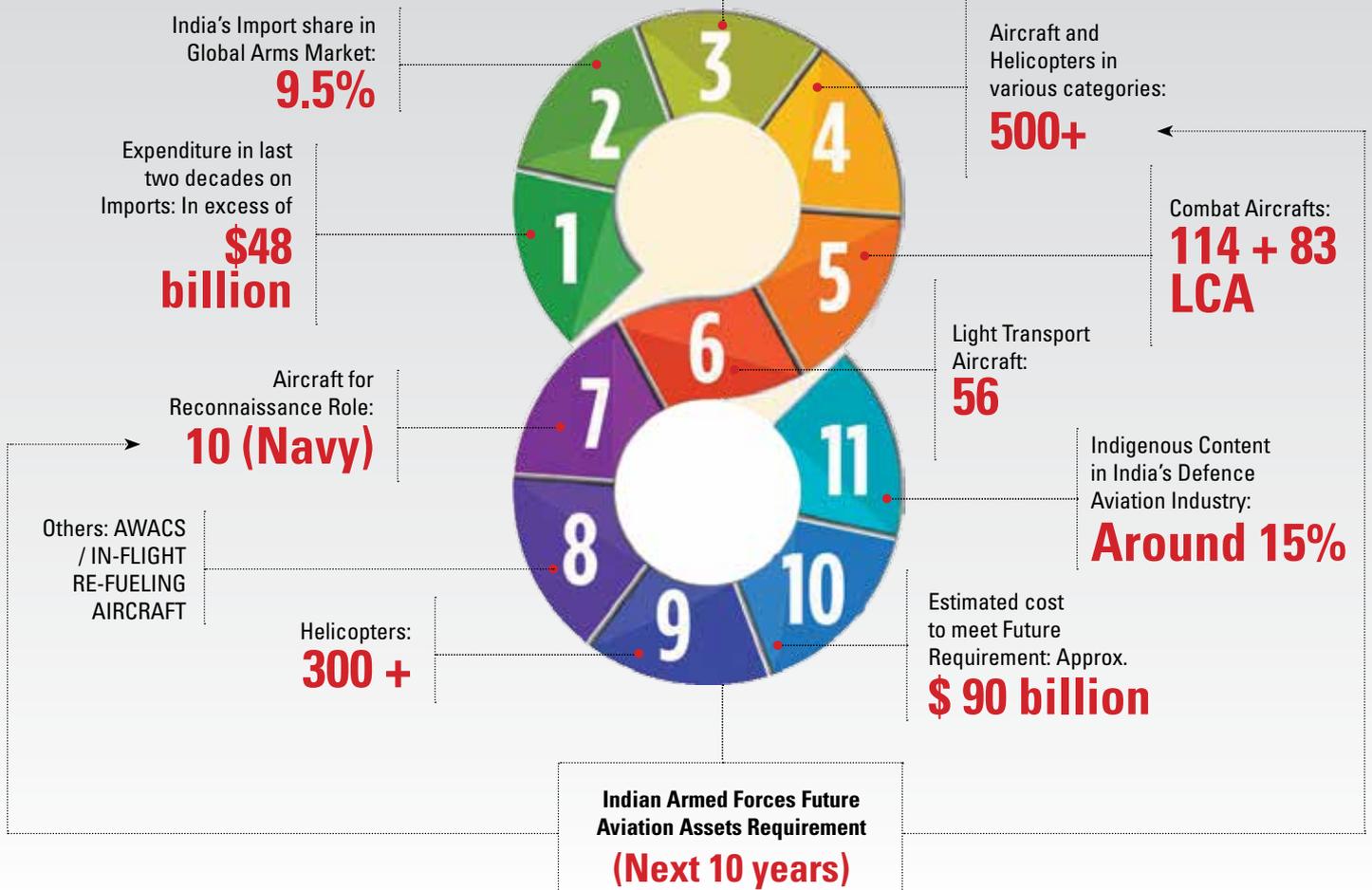
Make in India started as a mission critical and with great optimism. The intent was to channelise the country's focus to indigenous manufacturing, create, nurture and own intellectual capital, serve competitive products to global customers and add value to India. It's journey in defence sector so far has been a damp squib considering its inherent inability to weave a coherent narrative. It's the right time to re-imagine the initiative through ideas that are innovative, disruptive and collaborative to overcome the earlier pitfalls and lay the enabling foundation for extensive leap into the future with success.

Curated Collection of Articles....

RE-IMAGINING MAKE IN INDIA: KEY POINTERS



India was second largest arms importer (2014-18)



SETBACKS / REASONS IN INDIGENISATION FAILURE

Basic Trainer Aircraft Category: Failure of Hindustan Aeronautics Ltd (HAL) to provide a suitable alternative to the problem-ridden HPT-32 and ageing HJT-16.

Indigenous Aircraft Engine: Failure of the game changer Kaveri engine due to dilly dallying approach and clear road map for development

Combat Aircraft: The HAL-designed HF24 Marut—the first indigenous combat aircraft—failed to meet IAF's high-performance criteria

Transport Aircraft (Wide Bodied): Failure of Project Saras as it hasn't moved ahead

Air-Launched Weapons: Sluggish pace; currently several systems by DRDO are under various stages of development and integration, including the Smart Anti-Airfield Weapon (SAAW) and Astra Missile.



THE SOLUTION

- Need to exploit the current opportunity through realistic, pragmatic and hand-holding approach, to indigenise defence aviation industry.
- Transform from being risk averse to risk taker and understand that Defence R&D is cost heavy with low success rate
- The collaborative and cooperative approach between policy makers and policy executors
- Renewed focus on enhancing defence capabilities, pragmatic checks on imports, funds infusion, technology absorption and replication, well defined bench mark, fixing of role and accountability of various stakeholders (DRDO, DPSUs, and OFB), competitive and level playing field between government and private sector players to create a robust ecosystem that's capable to undertake future expansion of scale along with economies of scale.



DID YOU KNOW?

India has the fourth largest military aviation assets in the world and operates the largest fleet of foreign-designed aircraft

INDIA'S AERONAUTICAL INDUSTRY INDIGENISATION STILL A DISTANT DREAM

The fulfilment of 'Make in India' dream depends on languid bureaucrats, complacent scientists and a complex, document, the 'Defence Procurement Procedure', which, even after six iterations, has failed to deliver anything substantive. A 50-year vision for self-reliance in weaponry, and a clear-cut strategy, for its implementation by an empowered 'czar' is urgently needed

By **ADMIRAL ARUN PRAKASH (RETD)**

There is an imperative need to focus on boosting indigenous manufacture of aircraft even though the Light Combat Aircraft (LCA) project continues to be at times static or moving ahead sluggishly; while the indigenous Kaveri turbo engine after decades is yet another example of DRDO's failed venture. Nevertheless, the present government seems dead set on indigenisation with focus on "Make in India" which is the pet project of Prime Minister Narendra Modi ever since he assumed office in 2014.

These assume significance in view of China's 2015 Military Strategy which unequivocally, declared the necessity for the country to, "...develop a modern maritime force commensurate with its national security needs; to safeguard its national sovereignty and maritime interests, and for building itself into a maritime power." The maiden sortie, on May 12, 2018, by PLA Navy's (PLAN) first home-built aircraft-carrier, marked yet another milestone in China's resolute pursuit of

comprehensive maritime power. Designated, 'Type 001', this ship will join the refurbished Soviet-era carrier Liaoning; while a much bigger follow-on 'super-carrier', the 'Type 002', is stated to be under construction. If each of PLAN's three fleets is to have a carrier, China will need five to six such ships.

The shift of maritime focus from 'offshore waters defence' to 'open seas protection', mandated by the 2015 Strategy, clearly signalled the PLA Navy's intent to brush aside the notional 'first-

island chain' barrier, and sail into the blue waters of the Indo-Pacific to project power and exercise sea-control. Having inaugurated its first Indian Ocean base in Djibouti, and invested in strategically located ports such as Gwadar and Hambantota, the PLAN is now well-positioned to mount expeditionary operations at India's doorstep.

Two aspects of China's new strategy deserve the close attention of India's defence planners. In order to keep US Navy aircraft-carriers at bay, Chinese scientists evolved a unique anti-ship ballistic missile capability, on which its 'anti-access, area denial' (or 'A2/AD') doctrine is based. The reconciliation of its strong belief in A2/AD with a hugely expensive carrier-building programme signifies a major doctrinal shift within the PLAN. The other

INSIGHT: THE PULL SHOT



LCA Tejas (naval version)

important point of note is China's obsession with technological autonomy. They have taken great pains to ensure that their home-built carriers are equipped with an indigenous fighter. Having acquired a prototype Russian Sukhoi-33, the Chinese reverse-engineered it to produce the J-15 (Flying Shark), carrier-borne fighter, disregarding Russian protests over IPR violations.

If India is to forestall intimidation, it will need to plan a robust maritime response. Regrettably, declining defence budgets and a dysfunctional acquisition system have steadily eroded the combat capability of our armed forces. In 2014, it seemed that India's comatose military-industrial complex would be jolted awake by Prime Minister Modi's inspiring exhortation to 'Make in India'; but four years later, an indifferent politico-bureaucratic system has reduced it to a sterile slogan. In this bleak scenario,

a look at the navy's successful indigenization endeavours is educative.

Realizing that no nation had ever become a maritime power by importing hardware, a farsighted naval leadership planted the seeds of self-reliance, in the 1960s, by persuading the government to embark on indigenous warship production. In the face of great scepticism, Mazagon Docks undertook licence-production of the British-designed Leander class frigate, and delivered the first ship in 1972. Supported by a naval ship-design organization, Indian shipyards have, since then, launched nearly 150 warships, ranging from patrol boats to aircraft-carriers and from hydrographic vessels to nuclear submarines. Indigenous in design, these home-built warships await the development of weapon, sensor and propulsion-systems by our scientists.

Having tasted success

in warship-building the navy turned its attention to the field of aeronautics. In the early 1990s, finding the DRDO's Light Combat Aircraft (LCA) programme in doldrums, the Indian Navy (IN) decided to explore the feasibility of a carrier-borne version. The decision to initiate a LCA-Navy programme acknowledged the talent and ingenuity of our aircraft designers and engineers, and aimed to energize our stagnant defence-technology base. A closer examination of the embryo-LCA revealed major challenges in adapting a shore-based aircraft to fly from a ship; but the navy affirmed its faith in the programme by initiating a development programme and contributing over Rs. 400 crores, as well as engineers and test pilots to this DRDO project.

Very early in the programme, the Indian Navy had, realistically, acknowledged the possibility that this project may; (a) either not

succeed or (b) fail to meet the timelines required for India's first Indigenous Aircraft Carrier (IAC-1). A conscious decision was, thus, taken that while the LCA-Navy project would be funded and progressed, the service would, as a measure of prudence, identify an alternative aircraft for its new carriers. As the LCA-Navy programme kept slipping, this alternative turned out to be the MiG-29K which now flies from INS Vikramaditya.

The IAF inducted the LCA into squadron service, in 2016, and has placed an order for 123 more aircraft. In the navy's case, the prototype LCA-Navy was rolled out in July 2010, and first flew in April, 2012. While a few simulated carrier trials have been undertaken from ashore, there is a long way to go before the LCA is ready for ship-borne operations. The IAF and navy versions of LCA are both powered by engines of US origin, but they both suffer major performance shortfalls due to deficit engine-thrust. On this count, both the services have declared their intention to look for fighters from abroad.

This brings us to the closely related topic of the indigenous Kaveri turbojet engine. Under development, for over two decades, the Kaveri is yet another DRDO venture that failed; due, as much to design deficiencies as to indecisive project-management. The HF-24, Marut fighter, abandoned prematurely, demonstrated that until India can design and produce its own aero-engines, the performance of any indigenous aircraft will be constrained by technology that can be imported. The ability to design a turbo-jet engine, however, involves arcane skills, and Kaveri's project-managers should have sought timely

foreign expertise, instead of putting the project in limbo.

One cannot but emphasise strongly that the LCA and the Kaveri constitute the vital core around which India can build a strong and dynamic aeronautical industry. Their design, development and flight-testing programmes have yielded priceless data which must be exploited. Steered to success, these projects could spawn a family of combat aircraft, drones and even cruise-missiles. A marine gas-turbine version of the Kaveri is also feasible to power our warships.

Most DRDO projects have failed, due to the absence of political vision and guidance, coupled with a deficit of project-management skills. The navy's warship building programmes (including the nuclear submarine projects), have clearly demonstrated that user-participation and project-management by handpicked Service officers are the keys to outstanding success.

Fifty years of bitter experience should prompt the PMO to initiate a major paradigm-shift in

defence-industrial programmes. The user Services must be placed in the driving-seat of such projects and experienced military personnel positioned in management positions. Strategized over a 25-year timeframe and professionally managed, the LCA and Kaveri projects could become the torch-bearers of Modi's 'Make in India' dream and show the way to others.

With frequent reports of Armed Forces needing to be modernized and lacking weapons and almost every meeting of the Defence Acquisition Council (DAC) chaired by the Defence Minister clearing projects worth crores of rupees for acquiring latest weapons for the three Armed Forces, it surprises many when senior military leaders make gratuitous public pronouncements regarding India's readiness to 'fight a two-front war'.

But, this turns into trepidation when reports appear that the Army is looking for eight lakh rifles, carbines and machine-guns, in the international market, to equip its 13-lakh jawans. At the same time, our uninhibited

IF INDIA IS TO FORESTALL INTIMIDATION, IT WILL NEED TO PLAN A ROBUST MARITIME RESPONSE. REGRETTABLY, DECLINING DEFENCE BUDGETS AND A DYSFUNCTIONAL ACQUISITION SYSTEM HAVE STEADILY ERODED THE COMBAT CAPABILITY OF OUR ARMED FORCES



Kaveri aero engine

INSIGHT: THE PULL SHOT

A CLOSER EXAMINATION OF THE EMBRYO-LCA REVEALED MAJOR CHALLENGES IN ADAPTING A SHORE-BASED AIRCRAFT TO FLY FROM A SHIP; BUT THE NAVY AFFIRMED ITS FAITH IN THE PROGRAMME

Comptroller and Auditor General (CAG) regularly exposes, in Parliament, grave deficiencies in India's military wherewithal.

What the country needs is a 50-year vision for self-reliance in weaponry and a clear-cut strategy for implementation by an empowered "Czar." But, what we get, instead, are knee-jerk responses, like the arbitrary cancellation of a crucial anti-tank missile contract by the Defence Ministry and its reported restitution at the behest of a visiting Prime Minister.

One Defence Minister, provided further proof, when he recently confided to the media, that days before the Indian army's cross-border raids into Pakistan, he had to send officers abroad, "...with authority to carry out on the spot purchases." If a relatively minor army operation (hyperbolically described as 'surgical strikes'), involving a few dozen soldiers, required urgent 'on the spot purchases' from abroad, how would India manage to sustain half a million troops deployed in an intense and protracted conflict on two separate fronts? While this conundrum does not seem to trouble our decision-makers, the tax-payer needs to reflect

on some facts about our two potential adversaries; China and Pakistan.

Pakistan's army is the seventh largest in the world, and even though embroiled in politics and religion, its professional capabilities, notwithstanding serial defeats, cannot be ignored. We may sneer at the Pakistani 'deep state', but need to acknowledge its strategic master-stroke, whereby it has ensured steady arms-transfers to the Pakistani military from its 'all-weather friend' China. Having created a high level of equipment commonality with the People's Liberation Army (PLA), Pakistan can go to war, confident that its attrition losses will be expeditiously replaced from PLA stocks.

By comparison, India's, acute dependence on imported weaponry (60%-70% of Russian origin), will constitute a grave handicap and vulnerability in a conflict. Over time, not only have Indo-Russian relations become purely transactional, but the (post-Soviet) Russian arms industry has proved incapable of providing timely support for its products; a fact repeatedly pointed out by the CAG. Other foreign suppliers may prove

equally unreliable in wartime.

Coming to China; the PLA, as the world's largest military organization, boasts of formidable capabilities in the conventional, nuclear, cyber, maritime and space domains. China's true strength, however, lies in its vast military-industrial complex, that not only supports its army, navy and air force, but has surpassed Britain, France, and Germany as an exporter of arms; 70% of them to Pakistan, Bangladesh and Myanmar. Ironically, in 1949, when the People's Republic of China (PRC) came into being, India was industrially well ahead of it, because demands of World War II had led to the establishment of arms, ordnance and aircraft production facilities to support the Allied war effort world-wide. So, how did we slip behind so drastically?

In the early 1950s, a fraternal Soviet Union had commenced a massive transfer of arms to the PLA, but as ideological fissures emerged the Soviets threatened to stop aid. The far-sighted Chinese leadership ordered clandestine appropriation of drawings and technological data relating to Soviet weapons. Once the split actually occurred, in mid-1960s, the Chinese, in a resolute bid for self-reliance, launched a national mission of reverse engineering ('*guochanhua*' in Mandarin) Soviet weaponry.

The first phase of '*guochanhua*' helped China establish, by the mid-1980s, serial production of Soviet-origin tanks, artillery, submarines, jet fighters and bombers, as well as strategic systems like ballistic missiles and nuclear submarines. Manufactured without Soviet licences, many of these products had serious flaws, and even though they contained Western



HF-24 Marut



components, they were 'made' and not just 'assembled' in China.

China has, subsequently, launched repeated cycles of '*guochanhua*', with the aim of acquiring latest military and dual-use technologies, using all means including industrial espionage and violation of intellectual property rights, if required. By the turn of this century, China's own scientific prowess is said to have surpassed that of Russia. Today, China has stunned the USA, by its ingenuity, exemplified by; the world's fastest super-computer (the Sunway Taihu-light), J-31 fifth generation stealth-fighter, an electro-magnetic aircraft catapult to equip its new aircraft-carriers and huge strides in robotics, artificial-intelligence and drones.

India, by a quirk of circumstance, became an economic and military entity, with great-power aspirations, before it could become a significant industrial power. Consequently, we have an anomalous situation, where a nuclear-weapons state, with the world's fourth largest

armed forces has to support their operational needs through massive arms imports. All this, in spite of a vast military-industrial complex, a large pool of DRDO scientists and a network of sophisticated laboratories, backed by advanced production facilities of the Defence PSUs.

The Bangladesh War was won only because General Manekshaw sought a grace of nine months to obtain equipment for his troops. The brief Kargil War required desperate replenishments of ammunition, midway through the operation. India's continuing dependence on foreign arms, coupled with a dysfunctional acquisition process has eroded the combat readiness of our armed forces. Foreign arms purchases, considered a 'golden-geese' for political war-chests, have also engendered a morally-corrosive system of corruption at many levels.

Our myopic failure to learn from experience, and to acknowledge the deleterious impact of this void on India's national security, may cost us dearly vis-a-vis future

machinations of the China-Pak axis. It is a pity that, not one of our post-independence political leaders showed the foresight to launch an initiative, resembling '*guochanhua*' that could have made India self-reliant in weapon-systems, by today.

What we need is a 50-year vision for self-reliance in weaponry, and a clear-cut strategy, for its implementation by an empowered 'czar'. But what we get, instead, are knee-jerk responses, like the arbitrary cancellation of a crucial anti-tank missile contract by the Defence Ministry, and its reported restitution at the behest of a visiting Prime Minister.

Modi has given us the dream of 'Make in India', but its fulfilment depends on languid bureaucrats, complacent scientists and a complex, document, the 'Defence Procurement Procedure', which, after six iterations, has failed to deliver anything substantive. It is already late in the day, but if we never make a start, how will we ever get there? ■

—The author is a retired Navy Chief

INDIA, BY A QUIRK OF CIRCUMSTANCE, BECAME AN ECONOMIC AND MILITARY ENTITY, WITH GREAT-POWER ASPIRATIONS, BEFORE IT COULD BECOME A SIGNIFICANT INDUSTRIAL POWER

DEFENCE TECHNOLOGY AN INDIAN CONUNDRUM; AN ACADEMIC APPROACH TO SOLVE IT

By **LT GEN P R SHANKAR (RETD)**

The only way to end India's defence technology conundrum is to engage academics like IITs, Indian Institute of Science (IISc), National Institutes of Technology (NITs) and such other organisations for intensive Research & Development (R&D) in the field concerned. This will give a major fillip in developing indigenisation in defence technology and our nation will achieve strategic independence

T

he International Shift to Future Military Technologies: The United States (US) has a new command called the Army Futures Command to modernise the Army. It had six priorities- long range precision fire, next generation combat vehicle, future vertical lift platforms, a mobile and expeditionary Army network, air and missile defence capability and soldier lethality. Disruptive technologies are part and parcel of these next generation systems. They have an outlay of 18 billion US dollar for development of laid down future capabilities.



Himalaya building in IIT Madras

China is reorienting into a Global Force capable of operating across oceans and continents. It is going hammer and tongs at it by incorporating next gen technologies. It has sent over 2500 People's Liberation Army (PLA) scientists and engineers systematically to universities abroad to study and get hold of latest technologies – navigation technology, AI, combustion in scramjet engines (hypersonic aircraft capable of sixmach), directional-emission high-energy laser et al. It intends to catch up with US in a decade at any cost.

The Russians are smarter. Quietly they have been focusing on similar technologies. For every new tech-based weapon system coming out from the US stable, there is a Russian competitor. They are selling and trading technology. Defence technology is their export-oriented earner. It is their route



Former Army Chief General Dalbir Singh alongwith other dignitaries during a conference

to regain superpower status.

Israel has made defence technology an export-oriented commodity. Old, new, next generation, disruptive technologies – they are in the game in all of these. UK is carrying out an assessment as to what technologies it wants to invest and develop for export. Make no mistake, UK might never need these defence technologies for itself; since after Brexit, there will be no enemy greater than itself. However, the nation of shopkeepers is eyeing export-oriented revenue.

INDIA – THE NET IMPORTER

India remains a net importer of defence technologies from these countries (less China) and is destined to remain so. Our capability to develop core defence-oriented technology, harness it and ingest it into our armed forces is very poor. This is a statement of fact and not a criticism. Unless India can harness its technological potential its defence budgets will never be enough. Unless India becomes technically savvy, it will not be able to defend its future five (5) trillion USD dollar economy. India needs to understand that. However, it has

a major conundrum. India has never felt that technology bought is costly and technology owned is cheap. Indian armed forces are comfortable and willing to buy costly technology but have been very uncomfortable and reluctant to invest in indigenous technology.

PMS NUDGE TOWARDS IITS

Prime Minister Narendra Modi recognises this deficit. He understands that while the armed forces are solid as a rock and dependable in most respects, but even if they are like a rock, they are static. They need to be dynamic to take the revolutionary path beyond Defence Research and Development Organisation (DRDO). The Byzantine procedures binding the armed forces and the Ministry of Defence (MoD) need an outside maverick approach. That is why he has instructed the Indian Institutes of Technology (IITs) to start contributing to the technological needs of the armed forces. The PM's initiative needs understanding. He is giving a major signal to all Indians to heed. Here is a man who is attempting the unconventional, will India fail him?

The standard question from

OUR CAPABILITY TO DEVELOP CORE DEFENCE-ORIENTED TECHNOLOGY, HARNESS IT AND INGEST IT INTO OUR ARMED FORCES IS NEXT TO ZERO (ON THE NEGATIVE SIDE). I SAY THIS WITH A LOT OF RESPONSIBILITY, AS A STATEMENT OF FACT AND NOT AS A CRITICISM.





IIGP 2.0 underway



ISRO's Chandrayaan 2 mission

armed forces hitherto fore has been – why are our IITs not contributing to indigenisation of defence technologies? Why do our best young minds from IITs go abroad? Do they not have nationalistic feelings? The answer is – they have never been seriously involved in making anything for the armed forces? Hence can one conclude that they are not nationalistic. In the event of a pull from multinationals and in the event of the secrecy in defence affairs, it is only natural that our best and bright gravitate abroad. It is a revolving door phenomenon. So why blame them?

**MILITARY TECHNOLOGY
POTENTIAL IN IITS**

Students in IITs are like cadets in NDA – full of beans and enthusiasm. They really want to do something for the armed forces. Just for an idea. Three semesters back IIT Madras introduced a course “Overview of Defence Technologies”. The first semester saw 90 enrolments,

which rose to 250 in the second and shot up to 640 in the third! Such a groundswell response from across all discipline lines is overwhelming. Our brightest and the best want to know about armed forces matters and defence technology. They exhibited a great degree of “Josh” to attend the Def Expo in Chennai, visit the L&T Shipyard at Kattupalli, go around Indian Navy(IN) Ships docked in Chennai and attend a book release ceremony at Raj Bhavan on nuclear issues. A talk by, Air Marshal Varthaman (Abhinandan’s father) on IAF was attended by over one thousand students who rarely stopped clapping throughout the lecture. That is the kind of enthusiasm and it is infectious.

The best and brightest need a way to contribute. That is the missing link. Two students from IIT Madras have been chosen among the top innovative start-ups from 843 participating teams as part of the India Innovation Growth Programme (IIGP 2.0) held recently in Mumbai. They will receive equity-less funding worth Rs 10 and 25 lakhs respectively. IIGP 2.0 is a unique tripartite initiative of the Department of Science and Technology (DST), Government of India, Lockheed Martin and Tata Trusts. Both these projects have direct defence applications. The practicality of this enthusiasm is whether the armed forces can convert this potential into equipment, or will they buy it 10 years later from some foreign company?

Additionally, a project has been undertaken through Army Design Bureau (ADB) in IIT Madras which seeks to develop long range precision fire capability at a fraction of the cost which the US is putting

in. The technology and promise exist. It is now up to the Army to convert this technology into a product and destroy targets 100 km away. It demands a new outlook. The outlook is mental and beyond the Defence Procurement Procedure (DPP) which everyone knows by rote. What is more, for the first time the annual students’ techfest –

Shaastra, in IIT Madras is themed on Defence Technology with focus on Disruptive technologies like Artificial Intelligence (AI), Augmented Reality (AR), Cyber-security, Robotics and so on! That in turn is aligned with the DefExpo of 2020 which is also looking at Disruptive Technologies. It cannot get better than this from an academic



(Top) DRDO Akash missile test fired; Indian Army Dhanush artillery gun

STRAIGHT DRIVE

THE BEST AND BRIGHTEST NEED A WAY TO CONTRIBUTE. THAT IS THE MISSING LINK. TWO STUDENTS FROM IIT MADRAS HAVE BEEN CHOSEN AMONG THE TOP INNOVATIVE START-UPS FROM 843 PARTICIPATING TEAMS AS PART OF THE INDIA INNOVATION GROWTH PROGRAMME (IIGP 2.0) HELD RECENTLY IN MUMBAI.

institution. If after this, things do not take off and the candle gets extinguished – do not blame the PM, do not blame the IITs, blame yourself. As Shah Rukh Khansaid in “Chak De” that hockey movie – “KuchKariya”. Well, this is potential in one IIT alone. I have only highlighted the potential in one IIT. Pan India the potential is huge. Beyond this look at the research facilities of private industry and other national institutions like ISRO, DAE, CSIR et al. The potential is gargantuan. The challenge is also gargantuan.

A framework for defence interaction with Indian Institutes of Technology (IITs), such other institutions and massive involvement of our academics in research will certainly pave a way forward in mitigating the defence technology conundrum in India. What is needed an approach from Oxymoronism to a Framework. Hence, the is shifting from pontificating to suggesting a framework on which this entire thought process should progress. So, let us begin with a SWOT analysis of IITS.

SWOT ANALYSIS OF IITS

Strengths. Our IITs have the best brains in the country. The more important thing is that all IITs have excellent faculty. That is a major strength which is often underplayed and needs to be exploited. All IITs are multidisciplinary, have tremendous networking ability through their national and international connections. As a result, their ability to generate knowledge and solve complex problems is very high. They have tremendous research facilities and can set up focused facilities in better time frames. Of course, each IIT has a speciality which must be identified and nurtured.

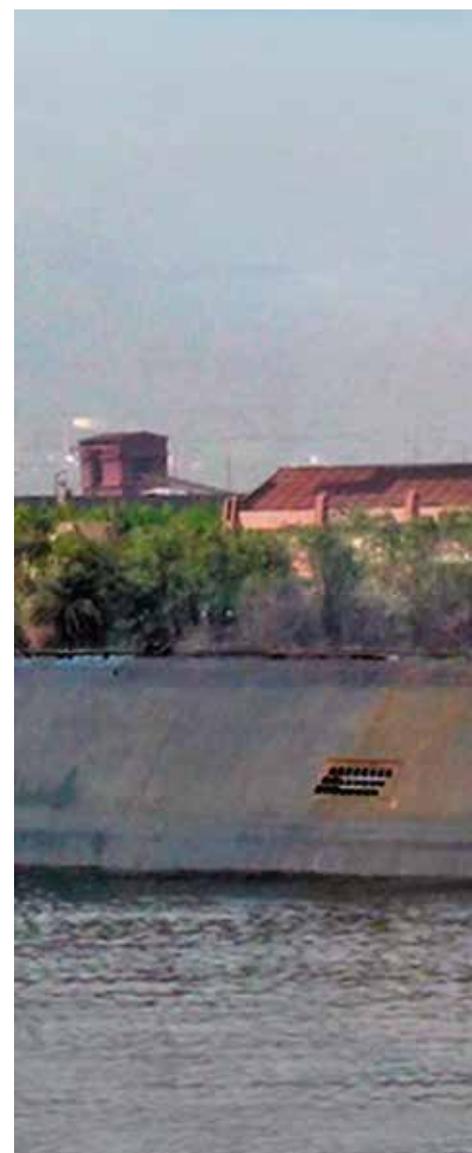
Weaknesses. The one major weakness of any IIT is it is not oriented to the Armed Forces and their world view of Defence is second hand, largely, through the DRDO prism. A direct connect must, therefore, be established with users including operational familiarization. It includes literally staying in the trenches with troops to understand the battlefield. There is presently no platform or structure available for generating a meaningful interaction with IITs. The Outreach is much below par. Address this.

Opportunities. With the expansion of the IIT system, the volumes and potential have increased immensely. Additionally, this expansion implies a lot of young and new faculty who will stay in the system for long. They are largely nationalistic and full of beans to contribute to national causes. They also know that defence R&D implies generation of cutting-edge technologies, for which they have trained abroad and have contributed to systems of other countries. In my opinion this is a huge opportunity now. A few years down the line it will vanish.

Threats. The major threat for any engagement with IITs will come from within the Armed Forces who are getting into unfamiliar territory. It is meeting of highly structured minds on one side with free thinking innovators on another. A few bridges must be built, and impediments overcome.

APPROACHES

Blue-Sky Approach. A blue-sky approach must be taken for new technologies and for next generation systems. These will largely be big projects for which



multidisciplinary research is contemporary in nature. They will have to be taken up with a view to achieve technology expertise or dominance. These projects will be long term in nature. They will perform have to have a multi establishment approach. They must be guided and anchored by a Service or a major Arm. In addition, they will have to be assisted by DRDO, OFB and DPSUs. Funding issues must be on a long-term basis. My recommendation is about three-four blue sky projects per major IIT and maximum one for



INS Arihant submarine

a new IIT. Simultaneously a blue-sky approach can be taken for disruptive technologies which are over the horizon like AI, Virtual Reality et al.

Core Research and Expertise. Core research must be undertaken on niche and exclusive technologies. To this end centers of study can be established in specified IITs to develop expertise in a niche technology. We must invest in the future.

Reinvention of the Wheel. In technologies where there is a denial regime / system in place,

we will have to reinvent the wheel and develop systems to gain independence from others. The project scope could be huge, but technology threshold / know how levels will not be high. The effort in reinvention must be to take a leap forward. The leap forward will have shades of Blue Sky projects. It can also be termed as the reverse engineering / copycat approach. Comparatively it will be a low-cost faster time cycle approach with good visibility.

Upgradation. Upgradation of an existing system by indigenous

technology is well feasible by IITs. Personally, I recommend that one existing system should be given per IIT through a consortium approach along with a private industrial player for upgradation. This is a low cost, low hanging fruit.

Import Substitution. Import substitution is another low hanging fruit. A lot of small parts, components and sub systems are still under import. Some of these need minimal research to produce indigenous substitutes. If IITs are involved with MSMEs a lot of ground can

be covered. It will save foreign exchange, expand the positive interaction and give confidence to IITs to take up larger products / systems.

Engineering Analysis and Testing. Many systems and processes in defence manufacturing needs analysis and testing backed by research. IITs have tremendous capacity to carry out such tasks through their research parks. This aspect will be especially beneficial for base workshops, base repair depots and shipyards.

MECHANISMS FOR ENGAGEMENT

There are many mechanisms which need to be put in place to ensure that there is enough engagement with IITs. As it stands some mechanisms have been put in place. However, the problem with the current mechanisms are that the defence establishment have an amorphous contact structure. They also tend to treat the IITs as another DRDO lab or a vendor. As a result, the effort is sub optimal and superficial. That must change. The need is of the defence establishment. It should not expect the mountain to come to it. Hence it must be ensured by the defence establishment that a well-defined structure is in place as per their requirement and the engagement should be deep and meaningful. I am specifically using the word Defence Establishment which encompasses the MoD, Army, Navy, Air Force, DRDO, PSUs, OFB and private defence industry. All of them need the IITs.

As far as the mechanisms are concerned, I visualize a Centre for Defence Technology and Innovation as a mandatory basic requirement in each IIT. It can



GSLV MK III D2

be funded by MOD and manned by experienced veterans and academics on an as required basis. They can be nodal agencies to enable interaction with the HQs of defence establishments, run competitions, organize courses, run start up and incubation activities, hold conferences and provide a whole host of other support activities in this venture. In this endeavor all Service academies and training establishments should also be co-opted. Extensive interaction with units and troops in op areas should be promoted. Similarly, each Service and Department must have a single window system for contact and follow up. The success of any mechanism lies in its ease and ability to enable interaction and engagement. As of now the mechanisms are ponderous and laboriously time consuming like the DPP.

I would also suggest very strongly that all DefExpos, Aershows and Conferences be made free of cost and compulsory for participation by IITs. Conversely each IIT should enter into MOUs with specified

establishments to progress certain technology fields. The model adopted by the Army Design Bureau should be refined to achieve better results. The current IDEX model, MAKE I / II et al, as good intentioned they are will achieve only marginal results. The wider the engagement the better. It would be worthwhile to study how global technology giants garner and scupper technology on a worldwide canvas.

A major form of interaction would be IIT students doing projects and internships in defence establishments. In fact, it should be made mandatory for each defence Laboratory / Base Repair Unit / Production Centre to take in a laid down number of students as interns. It has to be understood that ISRO has succeeded in using the IIT intellectual potential to its immense benefit in this manner. We need to copy it.

KNOWLEDGE ENHANCEMENT

Defence technology and management is niche, widespread and multidisciplinary. In India,

defence professionals across the board (Users, R&D personnel or for those in the industry) lack structured study formats/ programmes on defence technology topics. If the overall defence industry must grow, there must be broad based as well as focused courses available for people to study and carry out research. In my opinion, knowledge enhancement must be carried out at three levels.

Grass Root / Entry Level. At this level students must be given exposure to defence

technology through capsules / courses as electives so that basics are known to them and they are oriented to the subject. This generates interest in students to delve into defence technologies.

Middle Level. At the middle level, exposure should be to enable / impart hands on experience in weapon systems and exposure to battlefield environment. We need to evolve specialized courses in weapon technologies a la Cranfield University. These must be specially designed M Tech,

MS, PhD courses which can be conducted in select IITs/ IISc. These will be in addition to courses conducted at DIAT. All current M Tech programmes being attended by service officers need to be converted into focused technology cum management programmes to cater for the growth of knowledge within services.

Project/ Programme Level. At the level of major projects / programmes being undertaken, there must be specialty research in specific subjects which enables the programme to move forward as visualized. This will enable the overall knowledge bubble to expand.

CONCLUSION

The suggested framework is based on my experience in the Army, a couple of years exposure in DRDO at grassroots level and now two years in a premier IIT trying to get it into the defence framework. One might not agree with many of my suggestions. I have no issue. Come up with an alternative. Otherwise our Prime Minister's intent that IITs should contribute in indigenising defence technologies will only sound hollow after some time. Of course, one could say that this sounds like a Modi promo as one of my critics remarked on an earlier article of mine. Do we have a better option? If we can evolve a format sensibly it will be a step towards strategic independence which we have not yet achieved. As a future five trillion US dollar economy we must be strategically independent to be a reckonable power. ■

-The author is a retired Director General of Artillery, Indian Army and Professor of Aerospace Department, IIT Madras

FOR THE FIRST TIME THE ANNUAL STUDENTS' TECHFEST – SHAASTRA, IN IIT MADRAS IS THEMED ON DEFENCE TECHNOLOGY WITH FOCUS ON DISRUPTIVE TECHNOLOGIES LIKE AI, AR, CYBER-SECURITY, ROBOTICS AND SO ON! THAT IN TURN IS ALIGNED WITH THE DEFEXPO OF 2020 WHICH IS ALSO LOOKING AT DISRUPTIVE TECHNOLOGIES



ISRO's GSAT-29 being transported



SECURING THE NATION'S CRITICAL INFRASTRUCTURE THROUGH INDIGENISATION

China's rise has been crucially enabled by access to the developed world's markets. But India in its infinite wisdom have denied access to our own market to high-tech domestic firms and therefore the opportunity for indigenous growth

By **SMITA PURUSHOTTAM**



Why has the protection of Critical Infrastructure including national telecommunications networks - suddenly become a global issue? Several countries have consequently banned or restricted deployment of Chinese equipment in their networks through legislative and executive actions. In 2018 Australia adopted the Australian Telecommunications Sector Security Reforms (TSSR), explicitly alluding to enhanced security concerns over next generation 5G networks.

New Zealand too adopted its Telecommunications Interception Capability & Security Act (TICSA) and both countries banned/ restricted Chinese equipment in their networks. Even China adopted a National Cybersecurity Strategy emphasising protection of critical information infrastructure (CII) in 2016. No foreign company controls China's telecommunications networks. The United States not only designated Telecommunications as one of its 16 Critical Infrastructure sectors, its May 2019 Executive Order banning procurement of telecom equipment from "adversaries" - enjoyed legislative sanction under the National Defence Authorisation Act.

The short answer to the question posed above of course is China. In the United States' view, China's meteoric techno-economic rise is due to what a White House report calls its Economic Aggression. China has indeed "weaponised" economic

strategy. Its efficaciousness has been demonstrated by the decimation of our manufacturing sector detailed in a 2018 Parliamentary Standing Committee Report on the “Impact of Chinese Goods on Indian Industry”. This strategy has been implemented through its FDI, Overseas Direct Investment (ODI), APE (self-explanatory), Civil Military Integration (CMI) and Information Warfare (IW) policies. Through a multi-pronged IW strategy, which permeates the military, civilian and psychological spheres, China has conducted extensive and well-documented cyber-espionage and cyber-attacks on economic assets world-wide. Countries have thus been forced to respond with drastic steps

to stop the haemorrhaging of technological and military secrets by banning or restricting the induction of Chinese telecom equipment in their networks.

It is therefore not a coincidence that the focus of the pitched US-China trade-technology battle is Telecommunications. Huawei’s sales outside China have been declining as the Trade War begins to bite, with Chinese manufacturing and export indices declining. It explains why Huawei offered its 5G Technology stack for sale, albeit at a highly overvalued rate (Dr Richard Windsor CFA, Alastair Newton: “Reality Bites: Clash of the Titans”).

China’s all-round rise has been crucially enabled through market access – a fact that

President Trump realises more than most and has acted upon. We have done the opposite by denying market access to our own firms. This is a national tragedy.

After all, Chinese IW publications make it clear that IW and Information Dominance lie at the core of Chinese military strategy. Painfully obviously, IW dominance is connected to control of Communications networks. But the Department of Telecom has allowed a Chinese takeover of India’s critical information & telecommunications networks and power grids. Various Government agencies even supported the induction of Chinese equipment for India’s 5G roll-out, overlooking the dangerous implications and new risk dimensions of having Chinese AI+5G coursing through the nation’s circulatory system. As the US and Australians have noted, 5G exponentially enhances security threats. We are told that even with 4G configuration, the Chinese are in a position to remotely shut down our grids. Ceding control over digitised industrial operations, power grids and critical infrastructure to what in effect is our “adversary” is a feat worthy of entry in the Guinness Book under the appropriate category.

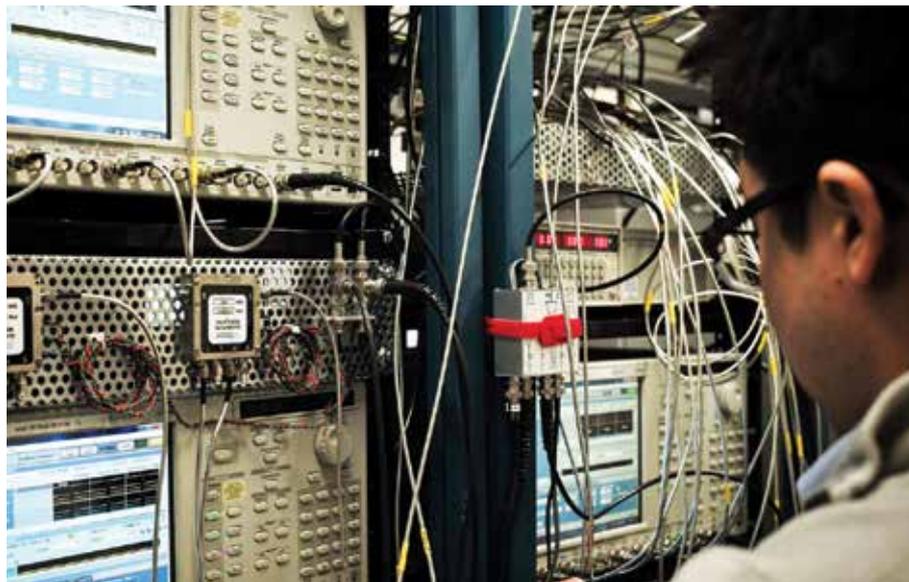
SABOTAGING DOMESTIC INDUSTRY PART 1

Let us see what our strategic geniuses have been doing. The Information Technology Agreement-1 and the FTAs dealt a blow to the nascent ICT manufacturing industry. Today, we are negotiating entry into the RCEP, with the grand ambition of (1) joining Chinese-

INDIA MUST NURTURE ITS HIGH-TECH MANUFACTURING SECTOR CUM R&D ECOSYSTEM WHICH GENERATES MAXIMUM MULTIPLIERS AND CONTRIBUTES TO HIGH-VALUE EXPORTS, DOMESTIC VALUE CREATION AND JOBS



THE UNITED STATES NOT ONLY DESIGNATED TELECOMMUNICATIONS AS ONE OF ITS 16 CRITICAL INFRASTRUCTURE SECTORS, ITS MAY 2019 EXECUTIVE ORDER BANNING PROCUREMENT OF TELECOM EQUIPMENT FROM "ADVERSARIES" - ENJOYED LEGISLATIVE SANCTION UNDER THE NATIONAL DEFENCE AUTHORISATION ACT



led manufacturing value chains in an era of decoupling and that too (2) at the lowest ends. Meanwhile China is not only directly exporting telecom products to India, it is re-routing them through RCEP members and relocating factories abroad to avoid US trade restrictions. As per preliminary calculations undertaken by young scholars from the Institute for Studies in Industrial Development – the RCEP and China within it accounted for the bulk of India's total ICT imports in 2016-17. But there was a sharp drop in China's share in 2018 even as Vietnam, Singapore and Hong Kong increased theirs. Clearly the Chinese are camouflaging their exports to India, as greater awareness of the damage unrestricted imports are doing to India's telecom manufacturing dawns.

SABOTAGING INDIAN INDUSTRY PART 2

We have already exposed the corruption within the telecom sector. Disincentivising domestic firms includes fixing tenders to favour multinationals and the Chinese, imposing unfair restrictions and expensive foreign certifications, withholding dues to Indian companies amounting to 100s of Rs. crores, and allowing Chinese predatory pricing and massive under

bidding to win sensitive Government telecom tenders. Let us not mention the attendant destruction of domestic Indian companies, and the dreams of the people of India for a better future.

Meanwhile, world-class Indian Telecom and cybersecurity companies are either folding or being taken over by foreigners. An Indian company, Nivetti System has designed and developed Secure & Trustworthy Network Operating System that is designed ground-up for security and a portfolio of high-end IP/MPLS Routers. There are several horror stories of Indian firms whose high-tech products have beaten European, American, Israeli and other foreign companies but still been overlooked in favour of imports. India doesn't seem to have graduated from its colonial overhang. Representatives of foreign firms are even invited to discussions by industry bodies on MHA task forces on internal security!

This is a national crisis. India must nurture its high-tech manufacturing sector cum R&D ecosystem which generates maximum multipliers and contributes to high-value exports, domestic value creation and jobs. India must become a telecom manufacturing and export hub. ■

– The author is a former Ambassador to Switzerland and Founder & Chairperson, SITARA (www.sitara.org.in)

RECOMMENDATIONS

Security can only be ensured through the deployment of indigenous technology and Indian companies are more than ready to step up. We have the following suggestions to make, if the Government is listening:-

1. Show some seriousness about Critical Infrastructure and declare Telecom a critical infrastructure sector, out of bounds to foreign participation on security grounds, which will not invite WTO retaliation.
2. Adopt a Telecom /ICT Security Act and Buy Indian Act.
3. Enforce domestic procurement of all key telecom and cybersecurity equipment across the public and private sectors.
4. Impose an outright ban on Chinese imports under Para 10 (d) of MII PPP Order which enjoins reciprocal treatment.
5. Negotiate a carve out for telecom equipment in RCEP.
6. Leapfrog technology: we can leapfrog straight to 6G where Indian companies hold patents by forging a public private partnership between Government research entities and India's R&D-intensive private sector.

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RE-IMAGINING 'MAKE IN INDIA' AN INTERNATIONAL PERSPECTIVE

'CAPTURING AND SUSTAINING VALUE IN A WORLD OF TRANSITION'



By **ANIL SETHI**

It is as important to align the population dividend of our skills needed for tomorrow & create micro entrepreneurs so as to recognise value transitions and this will enable India to not only transition from a nation of shopkeepers to one of micro entrepreneurs who generate skill based employment, but also capture transitioning value from the population and secure it for future generations

Till the 16th century, India was a collection of different fiefdoms & kingdoms. Then the British came &, over time, superimposed their university education system over India's caste based skilling system. This skill system consisted of informal training in skills that were passed from one generation to the next. Fast forward to today, where India faces a problem similar to the UK - too many university educated graduates running after too many jobs; on one side& the common refrain of too few skills on the other. As an example, give an ad for a driver & you get 1000 applications of college graduates and even post graduates who have passed with a third division or are college drop-outs, but an ad for a skilled electrician or plumber will go a-begging.

Switzerland is an excellent example of an economy driven by skills. 80% of all children in Switzerland focus on developing a particular skill after primary school,& only 20% go into university. What's more important is that children are encouraged to find the path that most motivates them, by way of information days for different professions (there are over 800), followed by one-day work experiences in those firms. At the same time, these firms are actively solicited to provide their future evolving needs, so that the skill-based education stays relevant. The result is a skilled population with over 98% employment and

average annual salaries of over \$ 80K. The government completely subsidizes skill development for young people as an investment into the sustainability of the local ecosystem, and lets the market find its own balance relating to employment and wage level. If anyone loses his or her job, the government provides training in a new or updated skill and pays upto 80% of the last salary for upto 15 months.

I was pleasantly surprised when a friend mentioned that his son wanted to become a plumber instead of going to university. The reason was that he would be able to start earning by the time he is 17, rather than having



to study till 25 or even later, and uncertainty about relevance of his education. His second (and more compelling) rationale was that as long as people exist, they have to use the WC.

However, the sustainability of a skill-driven ecosystem cannot be the sole responsibility of the state. At the same time, enrolling for and undergoing skill training, which can take over 2 years, cannot be something that we can expect unskilled workers, often from poor families where they are the sole bread-winners, to invest in.

An effective way forward would be to require companies to put forth a part of their budget for skilling new workers as apprentices. This could be more effective than

forcing these companies to pay into a CSR activity that doesn't directly impact them. At the same time, these companies have to commit to hiring these workers for a couple of years- & fire them at the end of this period if they don't perform.

A good source of keeping track of future skills is international companies. China, for example, recognised this early. It mandated that all international companies that wanted access to the Chinese market had to train & hire local people as a pre-condition to permitting these companies to sell in China. Over time, this has resulted in skills (& Technologies) coming to China that have global relevance. As a consequence, the

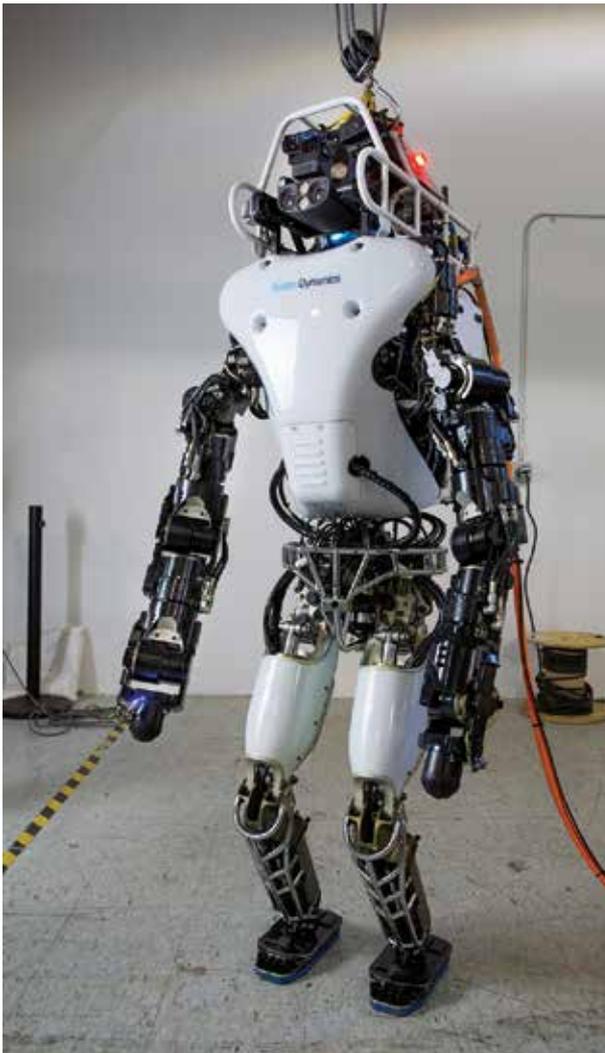
SWITZERLAND IS AN EXCELLENT EXAMPLE OF AN ECONOMY DRIVEN BY SKILLS. 80 PER CENT OF ALL CHILDREN IN SWITZERLAND FOCUS ON DEVELOPING A PARTICULAR SKILL AFTER PRIMARY SCHOOL AND ONLY 20 PER CENT GO INTO UNIVERSITY. WHAT'S MORE IMPORTANT IS THAT CHILDREN ARE ENCOURAGED TO FIND THE PATH THAT MOST MOTIVATES THEM

average wages in China have gone up & Chinese companies now sell their products internationally.

But there is another element to be considered. This is to recognise the transition of value, which was traditionally driven by goods & services. This began to evolve about 20 years ago, with the advent of the internet. Over the



VIEWPOINT



THE SUSTAINABILITY OF A SKILL-DRIVEN ECOSYSTEM CANNOT BE THE SOLE RESPONSIBILITY OF THE STATE. AT THE SAME TIME ENROLLING FOR AND UNDERGOING SKILL TRAINING, WHICH CAN TAKE OVER TWO YEARS, CANNOT BE SOMETHING THAT WE CAN EXPECT UNSKILLED WORKERS OFTEN FROM POOR FAMILIES WHERE THEY ARE THE SOLE BREAD-WINNERS TO INVEST IN

past decade, this value has moved from goods & services to how we consume them. Thus, a company like Amazon, which has insights about our needs, sometimes even before we become aware of them,

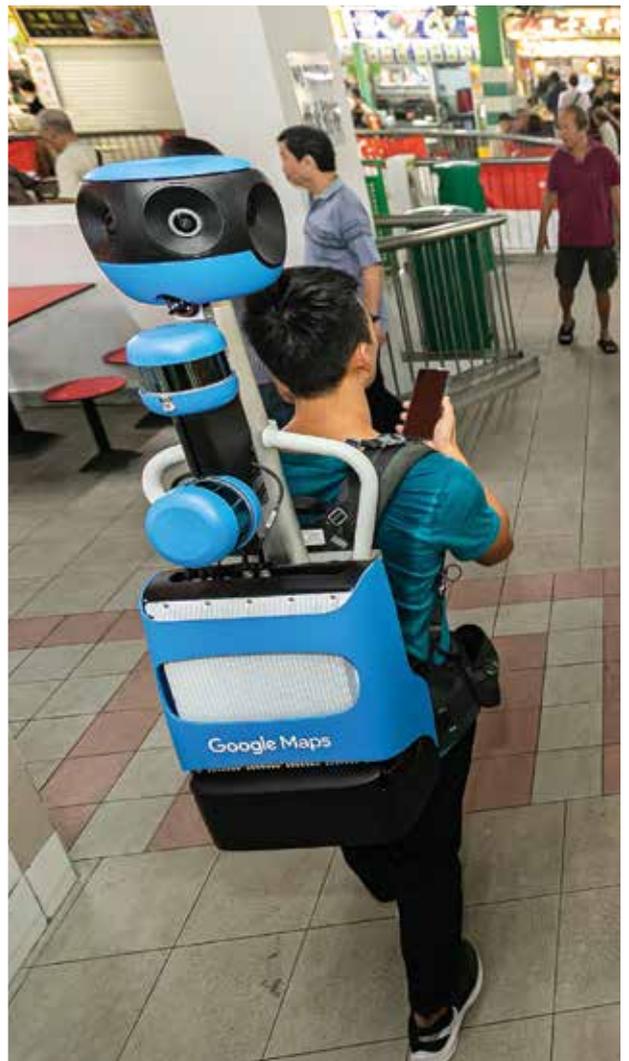
is able to capture more value as a consequence. A good example is how Amazon is able to know when a woman is pregnant, even before she knows it, due to the minute changes in how she searches and other factors like time & duration of search.

This has been perfected further by companies like Google & Facebook, whose product is 'us'. The longer they can keep us on their websites, the more they can monetise our time. This may sound obvious, but this belies an insidious undertone. Over time, there is a risk of our value as consumers transitioning out of the local economy to international

social media giants, in a scenario reminiscent of the second coming of the East India Company. In such case, the value from us as products is created in another economy, to our own detriment.

The subversion of our time by social media giants is but the first step. Since the revenue drivers of these companies is our time, they can (and will) provide other market needs like software for free. Given that software services are a key export earner for India, this shift is seismic.

This is also a reason why China does not allow Facebook & Google within China. Tencent & Alibaba, both valued at about \$500 billion



each, exist as a result. Beyond social media & revenue opportunities, we risk providing leverage to the ability of non-state actors to adversely impact national security considerations. The current US presidency and how it may have come to be is a case in point.

Even in the area of the military, there appear to be two key roles in enabling entrepreneurship. The first role of entrepreneurship lies in the realm of 'origination'. This is seen in countries such as Israel, where military technology is subsequently tuned towards civilian applications. This includes next generation satellite, IOT and communication technology. The

second role of entrepreneurial initiative is seen in 'reference'. This is done by DARPA (Defense Advanced Research Projects Agency) of the US. DARPA actively solicits technologies, not just from the US, from around the world pertaining to national security. It provides initial funding in the form of pilot revenue and becomes a reference for these young startups. Since technology startups lack customer traction in their early stages of evolution, DARPA's reference (and revenue) becomes a launch pad. In return, DARPA reserves the first right of use, externalising R&D. These options could become a footprint for India's

military for leveraging innovation with national security.

In conclusion, it is as important to align the population dividend of our skills needed for tomorrow & create micro entrepreneurs as it is to recognise how value transitions. This will enable India to not only transition from a nation of shopkeepers to one of micro entrepreneurs who generate skill based employment, but also capture transitioning value from the population & secure it for future generations. ■

-The author is Entrepreneur-in-Residence, Chair of Entrepreneurship, ETH Zurich and author of "From Science to Startup"

MY VIEW



ENERGISING MAKE IN INDIA THROUGH HOLISTIC APPROACH

Mustafa Kemal Atatürk, the founder of the Republic of Turkey and its first president, once said: “Freedom and independence is my character”

By **SANJAY SONI**

A

well established and fully functional industrial base is one of the major factors contributing to the rise of a country’s influence, strength and security. Only defence manufacturing coupled with economic might can make India a superpower. Keeping in view India’s underdeveloped R&D and production base (notwithstanding the limited success achieved by the DRDOs), and various defence industry-related policies and provisions whose success is contingent upon a liberal inflow of FDI, a healthy private defence industry would be a pre-requisite for India achieving self-sufficiency in defense manufacturing.

The military and civilian industries should evolve together, not isolated or separate from each other. Industries need to specialize in dual use technologies i.e. technologies which have commercial as well as military uses. These technologies are great drivers of economic growth and pervade

the aerospace, electronics and telecommunications, materials, machine tools. The dual use industries permit reverse spin-offs with the advancements taking place in the civilian sphere aiding new developments of military items and processes. For example, the technology for the brakes of the Bullet Train came

out of the knowledge gained from production of the F-86 aircraft by Japanese companies.

If you look around the world at success stories of defense self-sufficiency achieved to a high degree then countries like Japan (90%), Turkey (55%), Brazil (75%), and Spain (60%) stand out. Turkey is now building its own UAVs, naval ships and even a main battle tank. Over the last ten years, Turkey has embarked on a defence equipment policy which puts the emphasis squarely on private indigenous manufacturing and development.

Through a dogged pursuit of technology transfers and co-production contracts - when defence equipment from abroad is built in Turkey - the country has been able to build up a formidable industry.

Turkey now imports only 10% of its equipment directly from foreign suppliers. The other 90% is either the result of co-production/technology transfer agreements, international consortiums - seen on the F-35 Joint Strike Fighter project - or developed indigenously with little or no outside help.

What do we need for “Make in India” to really take off?

The GOI needs to take some small steps to energise the “Make in India” program and make it succeed.

A. Most importantly, we need to create a level playing field for private industry vis-à-vis DPSUs and OFB. Despite all that has been said and done about the opening of the defence sector to the private industry, there are still areas reserved exclusively for the government companies. Examples are :

- Refurbishment/Upgradation of existing missiles like Igla, R73 etc. can be undertaken only by BDL or the foreign OEM. Indian private players are still not allowed to take part in these programs.

- Upgradation program of the T-90 has not moved forward because the designated company is Heavy Vehicles Factory, Avadi. DGMF will not entertain any private company who would like to work on this programme.

- Upgradation of existing radars such as the old radars which would be very beneficial to the country as they could actually detect stealth aircraft. However, this area is reserved for BEL.

- Purchase of arms and ammunition – priority is given to OFB. Only those items not manufactured by OFB can be purchased from other sources – Indian or imported.

B. Price protection of 20% to be given to private Indian defence companies – any defence project requires a large capital outlay. New Indian private players with a high cost of capital cannot hope to compete with established foreign companies. Therefore, a price advantage of 20% is essential to ensure that they are able to compete in the short term until they achieve economies of scale. Else financial viability will be absent and dissuade most entrepreneurs from investing in the defence sector.

C. RFP's or Tenders should be first released under the "Make in India" category. If there are no indigenous suppliers who are able to fulfil the requirements, then and only then it should be released as a Global

Tender. In India, "Make in India" tenders are being released but due to vested interests, they are being cancelled and released as Global Tenders. Case in point the tender under "Make in India category" for 10 million rounds of .338 ammunition which was cancelled by the Army even though there are indigenous companies who could cater to the requirement. Pressure has been put by foreign suppliers and the Army is now preparing to release it as a Global Tender. Why is this so?

D. Remove the BG condition for MSMEs. How does the GOI expect MSME's to provide BGs for everything – getting an advance payment and even for performance of the contract? MSMEs do not have large banking limits. By putting such restrictive conditions, it



ensures that only large established companies can enter into the defense business. It is absurd that a BG is being insisted upon for repair of damaged and spoilt components of the Su-30. This is despite an MSME quoting nearly 1/4th of the cost that would have been incurred if these were sent to Russia for repair. Why should a BG be required from an MSME who is willing to take the risk of taking on a job of repairing parts which may not be fully serviceable and would get paid only if they are able to do so?. The Russian OEM would never agree to give a BG for such a project as it is very high risk.

Coming back to Turkey - Turkey's local defense industry has made remarkable progress in the past decade. Turkey's defense industry has jumped from a few tens of millions of dollars' worth of exports a decade ago to nearly \$1.5 billion this year. This is much higher than India's real defense export. Indian industry can do much more and we have proven it in all sectors like automobiles, engineering, plastics, cement and steel.

There is no reason why we cannot replicate this in defense manufacturing !!!

– The author is Director, Hughes Precision Manufacturing Pvt Ltd

THE DUAL USE INDUSTRIES PERMIT REVERSE SPIN-OFFS WITH THE ADVANCEMENTS TAKING PLACE IN THE CIVILIAN SPHERE AIDING NEW DEVELOPMENTS OF MILITARY ITEMS AND PROCESSES



UNDER WATER VEHICLES: SURFACING UP IN DEFENCE SECTOR

ROV and AUV Technology are being used extensively by many countries for their Inland security, Coastal protection and Various ocean going asset protection

By **KANNAPPA PALANIAPPAN P.**



The continuous quest of human exploration had let us to mine and dig the deepest of the oceans for Oil, Gas and Mineral wealth. To assist these herculean challenges Remotely operated vehicles(ROVs) have been in operation since 1950s.

As many would have spotted these fantastic machine shooting the wreckages of TITANIC in the famous 1997 movies, ROVs are wired robots used for exploring, observing under water structures and assisting in various underwater works.

ROVs have found great prominence in O&G industry as human intervention was tough for the exploration of oil which had extended beyond shallow waters to deeper oceans at depths of 500m to full ocean depths of 10km+..

At Eyerov, a marine robotics start up we build ROV's to meet various demanding jobs upto depths of 300m. Our systems are being deployed at oceans, rivers, dams etc...With the advancement of Technology, the development of Autonomous Under Water Vehicle had also grown very much, leading to these AUVs being used in various industries including defence. ROV and AUV Technology are being used extensively by many countries for their Inland security, Coastal protection and Various



ocean going asset protection. AUV systems predominantly work as survey and reconnaissances tool where as ROV systems find application in various areas like Explosive Ordnance Disposal (EOD), Naval assets survey and condition assessment.

India being a leading naval power of the world, to secure her 7000+ km long coasts and EEZ against the foreign invasions, she need cutting edge robotic technologies like AUV

and ROV systems. Our nations defence will gain strategic edge by developing such advanced technologies. Eyerov is one such entity based at Kochi Kerala, who are developing ROV and AUV to meet these demanding missions and to help future proof the capabilities of our defence forces.

- The author is CTO & Director, EyeRov (Irov Technologies Pvt Ltd)

MY IDEAS WHILE RE-IMAGINING MAKE IN INDIA

By **NIRAJ SAHAY**



The ambitious initiative of 'Make in India' was launched in 2014 to make India a most preferred destination for design and manufacturing and transitioning of the defence sector

towards self-reliance from the current 2/3rd of defence requirement that's being met through import. Initially, the start made by the Government found positive responses but gradually faltered mid-way due to various reasons. It's time for making the course correction and Make in India initiative requires re-imagination. The re-imagining of Make in India in my thought process revolves around few ideas that can make a lasting

impact and set the ball rolling towards realising the main goal of the initiative.

The Ideas are: **(a)** Enabling the competitive spirit in industry through reforms in the tax and labour law and ignite the animal spirit of business. **(b)** Level playing fields for DPSUs and private sector player and synergised focus on defence innovation, fair competition and competence to deliver. It is time to apply positive competitive pressure, accountability to realise cost, quality and delivery effectiveness. **(c)** Reform in procurement policies to make it simple, transparent and with no room for its ambiguous interpretation. Also provide the decision makers / decision making bodies with greater autonomy and authority. **(d)** There is urgent need to put emphasis in the fields of Artificial Intelligence (AI), indigenous chip design and development and cyber

security. **(e)** Focus on "Technology Absorption" and skill development of the work force. The industry should be encouraged to work on newer technology without the fear of failure. **f)** Provide conducive environment and work orders to start-ups, SMEs and MSMEs that bring in innovation and agility and assist them to further expand and scale-up. The concept of technology cluster and corridor is in the right direction and should be implemented on priority.

It is good sign that the Government has acknowledged the issues and working to resolve them. The focus on improving infrastructure along with supporting innovators from across the spectrum will bring back the momentum to 'Make in India in Defence' and the initiative will definitely meet its stated objective.

– The author is Vice President, Kinetix Engineering



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SDR A FORCE MULTIPLIER IN BATTLEFIELD MANAGEMENT SYSTEM

It is for the first time that there is greater sense of urgency as well as excitement amongst the end users to bring in Software Defined Radio (SDR) in almost all their systems.

By **MAJ GEN LAV BIKRAM CHAND (RETD)**



oftware Defined Radios, (SDR) have ushered in great excitement amongst the communication providers both in Military and other Central/ State Security Forces. ***For the first time there is greater sense of urgency as well as excitement amongst the end users to bring in Software Defined Radio in almost all their systems.*** SDR offers excellent flexibility-interoperability and scalability in communication infrastructure. The SDR based infrastructure can be suitably customised/ configured to meet the response time/ reliability/ availability for ***Command & Control Grid (Net), Sensor Grid and Shooter Grid.***

The combining of SDR and Software Defined Networks and the Coding schemes offers outstanding Mesh MANET capabilities in the system. **These are ideally suited for the various C4I2SR (Tac C3ISR) Grids.** But can one form of SDR be "One Size Fit All" for all operational roles and necessity? Or is it a better solution to have various form factors of SDR that are tailor made on the basis of the operational requirement? Or will a narrow band of frequency spectrum, as was the case in Analog and Digital Radios of yesteryears (30 – 90 MHz, 200- 512 MHz etc) be cost effective in terms of Band width, Capex etc? **These are some**

of the questions that the User formulating the Qualitative Requirement Specifications (GSQR) must analyse and unambiguously specify. While the technology offers straight forward answers its translation into end product needs due deliberations.

In the back drop of the above SDR in BMS scenario will be elucidated.

BMS: WHAT AILED IT?

Ideally "Is BMS required?" should be answered by a resounding **Yes.** However, the ambitious BMS project under Directorate General Information System (DGIS),

conceptualised in early twentieth century, OKedin 2007 was fore closed in 2018. *The main reason was the whopping ₹50000 to ₹60000 Crores required to equip 800 plus units. Out of this ₹3000 Crores was the estimate to develop a prototype model.* Detailed analysis of the cost estimates would be a voluminous report. And as such is not within the purview of this article. **However, it can be indisputably deduced that BMS is an Urgent and Mandatory operational requirement in high intensity modern warfare.** With the development and standardisation achieved in SDRs and Mobile ICT Infrastructure the cost of the BMS infrastructure (communication wireless sets, ruggedised Tabs/ PC, Mobile Servers or Data Banks etc) can be substantially reduced. **Ensuring that there are no duplication of Information Communication Technology (ICT) infrastructure and assets the cost will further reduce the capital cost. The application development cost and methods have not been addressed in this article.**



BMS is a key factor in any modern battle field. Time has come to revisit BMS (but not in isolation) and to broadly spell out **What is Required?** *Modernisation of the Armed Forces to be able to fight the Twenty First Century Battles in a High Technology Digital Battle Field is an urgent requirement.* However, the Budget available for National Security is meagre. Societal responsibilities of the Government are pressing. Social schemes at this point of time are urgent necessity for the Government for overall wellbeing of the Citizens of India, and a non-negotiable factor in the roadmap of India becoming a developed Nation. BMS, though an urgent necessity, needs to occupy its rightful place in the Force Structuring and Prospective Planning Matrix. Other Force Multipliers like Integrated Air / Space Defence, Modern Armament/ Weapons, Modern Soldier, Cyber Security,

Unmanned/Remotely Piloted Platforms, Smart Ammunition etc are high on priority list too. **However, without BMS, C4I2SR which is the binding fabric in the Modern Battle Field will have big gaping holes.** *The benefits of C4I2SR will not be available at the frontline soldiers or entities in contact battle. Therefore, it would be prudent to analyse the reasons for the high cost of BMS.* I am sure realistic costs, well within the budgetary constraints can be arrived at with the rapid advancements taking place in the SDR and Software Defined Networks (SDN) spectrum. *SDR and SDN complement each other and right sizing of the SDR and SDN components for various operational and logistics will ensure that the ICT resources are neither an over kill or an under-kill.*

One of the major money savers, without compromising the power of BMS would be commonality in basic ICT Infrastructure, the size

and the capability can be fine-tuned to meet the operational need of the entity. This operational need is governed primarily by its position, operational importance in the Force Hierarchy and the threat to its survivability in the battle space. E.g. Special Forces, operating deep in hostile territory, with no immediate link up with main forces would require State of the Art ICT equipment that is fail proof, reliable, light and yet flexible to the unpredictable data (information) needs. Similarly, every Infantry soldier in a Sub-unit, part of a main operations need not have complete ICT capabilities. All of them certainly require Situational Awareness capability; their commander can have higher capabilities of ICT. Similar analogy can be applied to mechanised entities, aerial platforms etc. **An efficient way is to have the capability in SDR to dynamically allocate appropriate ICT resources.**

IN TERMS OF ICT BEING RESILIENT, RELIABLE, ROBUST, AVAILABLE AND ADEQUATE TO SUPPORT THE DIGITAL FORCE THE PHYSICAL DOMAIN WILL BE READY ONCE NETWORK FOR SPECTRUM (NFS) AND VARIOUS SERVICE SPECIFIC STRATEGIC NETWORKS ARE IN PLACE (ASCON PHASE 4, INDIAN NAVY COMMUNICATION NETWORK AND AFNET OF IAF – ALREADY OPERATIONAL)

TACTICAL COMMUNICATION



INDIA WOULD CONTINUE TO BE SUBJECTED TO ASYMMETRIC WAR (BLEED BY THOUSAND CUTS) AND COVERT SUPPORT TO THE NAXALS AND INSURGENCY BY THE ADVERSARIES. A STABLE AND ECONOMICALLY STRONG INDIA IS NOT FAVOURABLE TO THESE ADVERSARIES IN THE REGIONAL GEOPOLITICAL AND THE GEOSTRATEGIC SCENARIO

EMPLOYMENT OF SDR AND SDN IN MODERN BATTLEFIELD

The lessons learnt from the attempted implementation of BMS are an important input in determining the way ahead and to make necessary corrections. Within this backdrop let us consider the employment of SDR and SDN in BMS. Only for ease elucidation the ICT Infrastructure has been broken into parts. In the Digital Battle Space all of these are a unified whole.

Command and Control - This layer primarily requires a failsafe information infrastructure, with agility of deployment governed by the role of the entity. Size could vary from Formation HQs to unit - Sub Unit - Teams- Squads. The primary requirement if availability of relevant intelligence, situational awareness, common operating picture synchronisation, threats, targets and effective means of tasking of its subordinate entities.

Surveillance and Threat

Analysis - Multi Sensor Data Fusion, Correlation, Corroboration and Target Identification and Tracking until neutralisation are the primary role of this layer.

Target Neutralisation - This is commonly referred to as Weapon Grid or Sensor to Shooter Grid. The main aspects of this layer are selection of appropriate weapon - target acquisition - target engagement (Direction of Own Arty Fire- DOAF) & destruction and Post Strike Damage Assessment - PSDA. DOAF and PSDA require matching communications and reach of observation.

Data Analytics and Decision Support System - Data Analytics would act like a sieve that ensures there is no info overload and int is available at the right place at the right time. **Mobile Data Centres (MDC)** are now available to provide this capability in field down to Unit level. MDCs will be in synch with the Regional Data Centres / Central Data Centres (Tactical Cloud functionality). This is where SDN play an important role.

SDRs and SDNs with MDCs

are best suited to form the ICT info infrastructure. The size, capacity, would increase as we go north bound from the forward most entity (Troops/ Soldier/ Field Commander, Sub Units, Teams) further Northwards to Units; Brigade Groups; Division; Corps and Theatre to Service HQs. All integrated HQs will be appropriately accommodated. While Command & Control functionalities are important and complex, focus is on Weapon and Sensor Grids. These grids are not computing and storage resources intensive. However, the long ranges of communication and varying data throughputs add to the complexity. **Accordingly, in this article the Weapon and Sensor Layers (Grids) are the areas of focus.**

FIRE CONTROL AND ASSESSMENT

Arty Fire Control has been taken as the case study, primarily because this is one action that is all encompassing and explicitly depicts the OODA loop (Observe - Orient - Decide - Act). It has

surveillance, receive/ derive intelligence, decision by Arty Commanders, selection of appropriate gun (weapon system), firing on target and damage assessment. Arty Fire Control must therefore be supported by mission critical secure, shared real-time situational awareness on land, in the water and in the air. With the introduction of long-range weapon systems including missiles, ranges from the Battery Command Post (BCP – including Gun Positions) to Forward Observation Officer (FOO) could vary up to 60 Kms. Ranges from Fire Direction Centre (FDC) to the division Arty resources in the digital battle field may be extended way beyond 60 Kms. In this operational scenario Arty Combat Command Control System (ACCCS) has to adopt a networked Mesh info-infrastructure Approach rather than the point to multi point approach. Incorporation of **BMS functionality in to ACCCS is an immediate operational need.** *In the absence of BMS functionality Integrated Theatre Battle can not be fought.*

BMS demand a unique IP Mesh technology that creates a fluid, self-forming, self-healing dynamic network, which adjusts in rapidly changing communication and mobile situations in the battle field. DOAF and PSDA for long range – beyond visual range Guns & Missiles makes it operationally mandatory to have video - Optical / IR feeds to the BCP, RCP-Regimental Command Post, FDC.

In the modern digital battle field the Modern Battery Organisation will typically continue to have Arty Regiments with Batteries and Gun sections. These resources would be integral to a Brigade (Brigade Group) and Division and commanded and controlled accordingly. In addition,

at the Corps level the long-range Arty weapons and even Missiles systems would be grouped and under their command structure. The Command Structure would typically consist of Gun Section, Gun Position, BCP, RCP, FDC, Fire Control Centre (Higher HQs). These entities would be supported by activities like: -

- Reconnaissance and Surveillance by sensors mounted on various platform like Satellite, UAVs, Hepters, FOO etc.
- Target details passed to BCP-RCP-FDC
- Selection of weapon system and earmarking of Fire Units
- Survey and Meteorology Reports.
- Orders to engage
- DOAF & PSDA etc

All the above activities require the FOO or the Inputs from UAVs & Surveillance devices to pass on the information over Fire Control Net (FCN- a part of C3I) to the FDC. The command to fire would also be issued over the FCN.

The FCN therefore requires a Mesh Radio with MANET facilities for ease of attachments and detachment of Arty assets. The Radio needs to be body worn (at FOO), Vehicle mounted and even on elevated platforms or with repeaters (could be unmanned too) for range extension. These radios would provide: -

- Ad-hoc IP Mesh radio with sufficient data rates for C3I Networks (Arty Fire Control NW)
- Reliable and Robust.
- Simplicity to Operate with adequate ranges (NLOS & LOS RF)
- Facilitate automatic and rapid simultaneous data and voice communications over fluid, ***self-forming, self-healing dynamic NW.***
- Enable Common Operating Picture and situational awareness.
- Encryption.

BRIJ- EXICOM LLP - DTC Range of Mesh IP and SDR Radios

SUGGESTED WAY FORWARD

- Formulate Roadmap for SDR and SDN for C3I Information Infrastructure
- Under IDDM, Indian Companies to Identify most suited and Technologically Advanced OEM Partner.
- End User to validate the partnership from the point of view of future proofing and flexibility.
- OEM Partner to Support in Development of Waveforms for SDR and also in Encryption.
- OEM to assist in establishing of Production line and Hardware design.
- Set up Indian accrediting agency to test and verify foreign components.
- Above all make a realistic assessment of cost. Uniformity in ICT infrastructure would bring down the cost considerably, Therefore, the most suited user agency (Signals) should be the lead agency.
- "Most importantly SDR can be very cost effective when the R&D is not from scratch, expertise of an OEM that has fielded SDRs in operational areas is utilised in partnership and the duplication of efforts in design and production is minimised. In case this is not done the SDR approach may have uncontrolled cost overruns in future developments."

Another important component of the Arty Fire Control Network is the Mobile Data Centres (MDC). This functionality can be achieved when the functionality of SDN is incorporated in the Radio Networks (SDRs are ideally suited for the same).

While the radio sets with these capabilities are available worldwide, M/s Brij Systems and M/s EXICOM LLP have entered into a contract with DTC to make the IP Mesh Radios in their facility in India. ■

– The author is a retired Indian Army officer from Signals. He has vast experience in design and rollout of ICT Communication Infrastructure both Strategic and Tactical.



DEFEXPO 2020 COUNTDOWN BEGINS

The biennial event DefExpo India 2020 offers an excellent opportunity for the Indian defence industry to showcase its capabilities, promote its export potential along with the opportunity to find new meeting ground for developing military industrial enterprise

The four-day 11th biennial edition of DefExpo India 2020 which is to be held from February five for the first time in Uttar Pradesh capital Lucknow offers an excellent opportunity for the Indian defence industry to showcase its capabilities and promote its export potential. With the theme of the Expo being 'India: The Emerging Defence Manufacturing Hub' and focus on 'Digital Transformation of Defence' it assumes significance since Uttar Pradesh alongwith Tamil Nadu is going to be a Defence Industry Corridor.

As Prime Minister Narendra Modi who has been a strong votary for strengthening of the armed forces to meet external challenges and undeterred by criticism went ahead with the purchase of 36 Rafale fighter aircraft from French company Dassault, said the Expo

will provide the opportunity to professionals and the industry to find new meeting ground for developing military industrial enterprise.

As Defence Minister Rajnath Singh who represents Lucknow in the Lok Sabha said "this premier

exhibition will provide a unique opportunity to interact across the entire spectrum of Defence Industries including Defence product exhibitors, manufacturers, users, decision makers and visitors. The exhibition will showcase the present and future of the Defence ecosystem."

The show will see a larger participation than the previous Expos with 702 exhibitors with 284 foreign and local delegates attending the event where there would be 160 international exhibitors.

Another major attraction for foreign participants to the show

is that the government has on the anvil plans to spend US\$130 billion for the modernization of the armed forces considering the increasing security concerns and the threats along the Northern and Western borders.

Among the items which the government plans to purchase include 1580 towed artillery guns, 7.5 lakh assault rifles, acquisition of 110 multirole fighter aircraft under the "Make in India" initiatives.

The Expo would provide a platform for both foreign and Indian defence equipment manufacturers the opportunity to grab a piece of this lucrative cake that is being offered.

With the government having made Foreign Direct Investment (FDI) 49 per cent through automatic route and 100 per cent through government route, this Expo would provide yet another opportunity for foreign equipment manufacturers to showcase their wares and also explore the possibility of partnering in joint ventures with Indian private sector companies who are into the defence sector.

The show will facilitate Business-to-Business (B2B) interaction with senior foreign delegations as also Government-to-Government (G2G) meetings and signing of Memorandums of Understanding (MoUs). The exhibition will also highlight emergence of Uttar Pradesh as an attractive destination for investment in the defence sector and act as a platform for alliances and joint ventures in the defence industry.

The state has a strong defence industrial infrastructure. It has four units of Hindustan Aeronautics Ltd at Lucknow, Kanpur, Korwa and Naini (Prayagraj), nine ordnance factory units, including Kanpur, Korwa, Shahjahanpur, Firozabad and one unit of Bharat Electronics Limited at Ghaziabad.

The Defence Industrial Corridor will encourage Defence Micro Small and Medium Enterprises (MSMEs), including Indian defence industry and promote Defence Public Sector Undertakings (DPSUs).

The Expo would provide a unique platform for Defence industry Original Equipment Manufacturers (OEMs), exhibitors



and private industry to display their latest innovations and capabilities in the field. It would also provide an opportunity to major foreign OEMs to collaborate with Indian defence industry and help promote Make in India initiative.

The DefExpo is expected to see Ministerial level delegations and visitors from all over the world and give them a glimpse of India's emergence as major manufacturing hub.

The Expo would provide attractive opportunities for co-development and co-production of defence equipment and systems not only for India's defence forces but also for exporting it globally. It will also highlight emergence of U.P. as an attractive destination for investment in Defence sector and act as a platform for alliances and joint ventures in defence industry.

Of India's two Defence Industrial Corridors (DICs), one is in UP while other DIC is proposed in Tamil Nadu. These corridors encourage Micro Small and Medium Enterprises (MSMEs), like Indian defence industry and promote Defence Public Sector Undertakings (DPSUs).

This DIC in Uttar Pradesh assumes importance since the state lies on the Golden Quadrilateral with excellent road network. The establishment of Amritsar Kolkata Industrial Corridor (AKIC) and the Eastern Dedicated Freight Corridor (EDFC) alongside the DIC, it would boost the industries in the region and specially in the area of Defence manufacturing.

With emergence of disruptive



"DefExpo will provide the opportunity to professionals and the industry to find a new meeting grounds for developing military industrial enterprises"

Narendra Modi
Prime Minister



COUNTDOWN

technologies which are on the verge of overtaking existing military concepts and therefore the need to rethink battlefield strategies, the Expo will provide an opportunity for exhibitors to showcase their products in keeping with these developments.

With Artificial Intelligence, autonomous systems, ubiquitous sensors, the focus on secure and timely flow of data and intelligence having become the lifeline of modern militaries, leading companies would be showcasing their products pertaining to these areas. It is in keeping with these developments that the Central theme of the Expo is “Digital Transformation” in the Aerospace and Defence sector.

India with its strength in Information Technology and



“DefExpo 2020 is organised by the Ministry of Defence, Department of Defence Production. This premier exhibition will

provide a unique opportunity to interact across the entire spectrum of Defence Industries including Defence product exhibitors, manufacturers, users, decision makers and visitors. Come and experience ‘Make in India’, and see the present and future of the defence ecosystem with our special theme of the exhibition-‘Digital transformation of defence’”

*Rajnath Singh
Defence Minister*

software development, is poised to bolster the digital transformation trend and to collaborate with world leaders in cutting edge military technology.

The Expo comes at a time when the government is focusing on “Make in India” and setting up Defence Innovation Hubs across the country to develop an ecosystem that will foster innovation and technology development in the Aerospace and Defence sector by engaging

industries including MSMEs, Startups, Individual Innovators, Research and Development Institutes and Academic.

With the increasing role of Information Technology even in the defence sector and about US\$50 billion being the proposed spend in this sector, the Expo offers immense opportunities for IT companies to play a major role in the defence sector and go for a big share of the cake.

The target being for 2020, the Expo could not have come at a more opportune time for the IT sector within the country and those from outside who are keen on participating in this area in the defence sector. With India contributing 3.7 per cent of the global military expenditure and having the fifth largest defence budget in the world touching U.S.\$42.2 billion, the Expo surely offers a window to foreign and domestic defence equipment manufacturers a window of opportunity to display their products and make a strong pitch for selling their wares to this country.

Another factor is the increasing manpower of the armed forces of the country which now touches about 1.3 million personnel and the government very keen on modernizing the armed forces and giving the personnel of the armed forces the best possible equipment to deal with any eventuality, it is indeed an opportunity for defence equipment manufacturers to showcase their wares as impressively as possible.

As the Minister of State for Defence Shripad Yasso Naik said “DefExpo 2020 is a mega Defence Exhibition providing global platform for a large congregation of Indian and foreign defence companies to showcase their Defence related products,” and nothing could be more apt than this for the DefExpo. ■





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EXPORT CONTRACTS BRING HANDFUL OF BILLIONS OF DOLLARS FOR RUSSIAN MANUFACTURERS



Moscow. Rostec State Corporation-led Rosoboronexport conducted over 200 pre-bid negotiations, conferences and technical presentations for foreign delegations during the International Aviation and Space show MAKS-2019 in Moscow's satellite town of Zhukovsky held from August 27 to September 1 resulting in big ticket orders for the company. There were many firsts during the XIV International Aviation and Space Salon MAKS 2019.

At pavilion F2 and the static testing pad of the show, Rosoboronexport hosted the demonstration of a number of aircraft models, out of which an Ansat helicopter with a cabin in the style of the Aurus

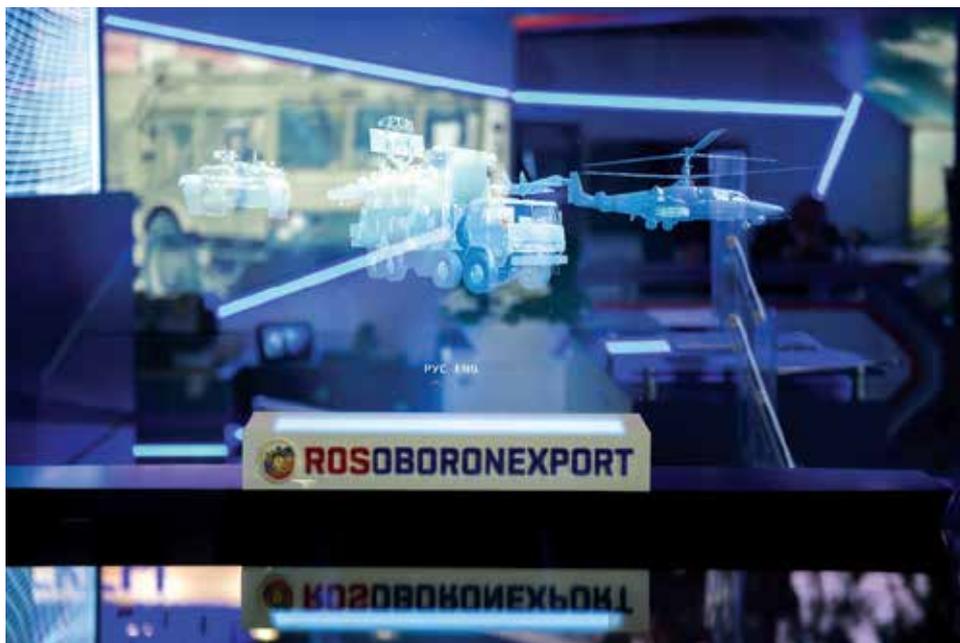
brand presented for the first time at MAKS. In addition, the first serially produced Mi-38 helicopter in VIP configuration was shown for the first time during the event. Also, the newest Russian Ka-62 helicopter

took part in the forum's flight programme for the first time.

For the first time at the MAKS air show, the PD-14 aircraft engine for the MS-21 aircraft designed by the United Engine Corporation (UEC) was on display. UEC plans to produce up to 50 PD-14 aircraft engines per year.

Among the military models was the fifth-generation Su-57 fighter, which was shown to the public for the first time at the static site of the air show, which took part in the flight programme also. The Su-57E is a fifth-generation multi-role aircraft system designed to accomplish a wide range of missions against air, ground and surface targets. It can be used in any weather, day or night, and in a severe jamming environment.

Air Force pilots came from various countries could make familiarization flights on Russian airplanes and helicopters during MAKS 2019. Beyond the discussion of issues of bilateral armaments cooperation, the company on the sidelines of MAKS-2019 has signed a memorandum of partnership with the government of the Yaroslavl Region, where the Engineering Union regional business unit is supervised by Alexander A. Mikheev.





THE SHOW WITNESSED ROSTEC'S DISPLAY OF MORE THAN 250 NEW MODELS OF AIRCRAFT, AVIONICS, AIRCRAFT ENGINES AND AIRFIELD EQUIPMENT, INCLUDING OVER 40 ITEMS WHICH WERE SHOWCASED AT MAKS2019 FOR THE FIRST TIME

Apart from Indian defence and aerospace majors of Hindustan Aeronautics Ltd (HAL) and BrahMos, the show witnessed Rostec's display of more than 250 new models of aircraft, avionics, aircraft engines and airfield equipment, including over 40 items which were showcased at MAKS2019 for the first time.

Besides many Russian and Indian companies, 182 firms from the US, Austria, Belgium, Brazil, Canada, Chile, China, Cyprus,

Czech Republic, Estonia, France participated during the event.

"A vibrant business and flight program of MAKS-2019 has promoted successful co-operation with the foreign delegations, at times led by topside designated persons. For instance, the demonstration of the top-of-the-line fifth-generation jet fighter Su-57E has definitely added up to its publicity on a global basis: the Rosoboronexport professionals have established an aggressive

interest for the jet fighter on the part of the foreign guests and media worldwide." Mikheev added.

The Rosoboronexport display including the massive motional installation at the company booth, which was showstopper, received appreciation by the air show organiser and adjudged winner under one of the nominated categories of the contest "GOLDEN WINGS MAKS-2019". ■

INDIAN DPSUs, HENSOLDT'S SENSOR SOLUTIONS, ELBIT SYSTEMS' HATTORIX AND DTC'S MESHULTRA MAJOR ATTRACTIONS AT DSEI 2019

DSEI 2019 witnessed more than 1600 exhibitors, 35000 plus attendees, above 50 nations along with 40 international pavilions

London. Major Indian Defence Public Sector Units (DPSUs) of Garden Reach Shipbuilders and Engineers, Goa Shipyard, Mazagon Dock Ltd and a number of Indian companies took part in Defence & Security Equipment International (DSEI) in London from September 10-13. Germany-based Sensor solutions provider HENSOLDT displayed its broad range of sensor technologies in the air, sea, land and security domains at DSEI 2019 which was held in London.

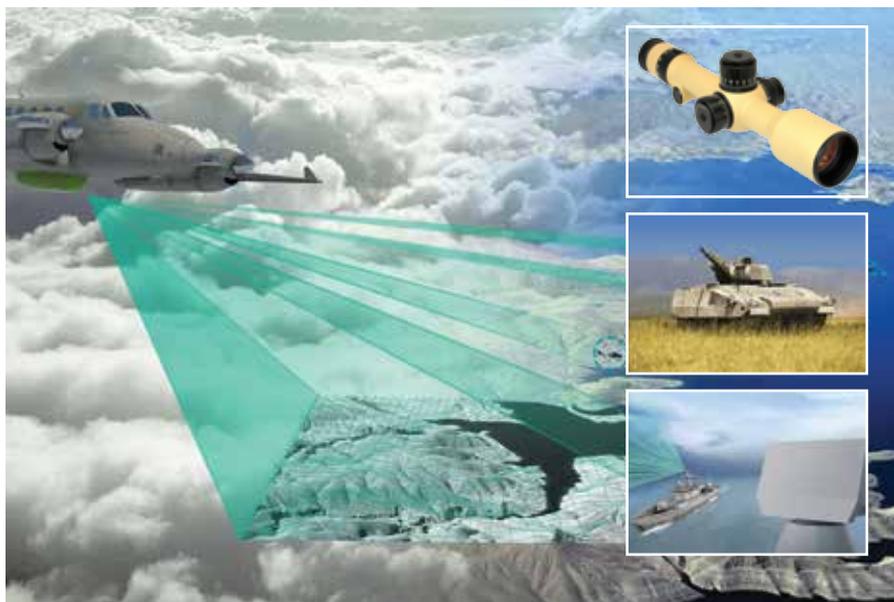
For the first time, HENSOLDT showed its newly developed SETAS electro-optical situational awareness system for armoured vehicles in operation. Alongside SETAS, DSEI witnessed HENSOLDT's capability in the land domain with several advanced optronic systems such as laser

rangefinders and designators, missile protection systems for tanks and a number of rifle scopes.

In the Air domain, HENSOLDT presented solutions for airborne ISR like its ARGOS-II HD multi-sensor system, the lightweight observation camera GOSHAWK-II and the PrecISR multifunction radar. In the

Sea domain, HENSOLDT featured the TRS-4D naval radar system, which is at present being installed on the new German Navy frigates and the US Navy Littoral Combat Ship, multi-sensor optronic masts for submarines and the opto-electronic laser detection system COLDS NG.

Another major attraction was Israeli Elbit Systems' HattoriX, which is a manpack Fire Support system that, for the first time, enables Forward Observers (FO) and similarly tasked tactical teams, to passively, rapidly and independently acquire Category 1



HENSOLDT Products Display at the event (L) Elbit Systems HattoriX

(CAT-1) targets (Target Location error of few meters).

HattoriX introduces a step change in the effectiveness of target acquisition at the tactical level as it demonstrably enable accurate and rapid engagement of Time Sensitive Targets (TST) and enhance the survivability of tactical teams.

HattoriX also includes a remote-controlled configuration for extended force protection. Users include FOs, Forward Air Controllers (FAC), Joint Terminal Attack Controllers (JTAC), reconnaissance teams, field intelligence and Special Forces.

Domo Tactical Communications (DTC), leader in IP Mesh Networks and Video technology, featured the latest MeshUltra Wireless Tactical IP Mesh Waveform in its display during DSEI 2019. Designed for the most hostile real-world environments in Military, Law Enforcement and Autonomous Systems applications, the MeshUltra waveform delivers increased range, greater reliability and higher throughput. And combined with DTC's "Interference Avoidance System" (IAS) Cognitive Radio capability, MeshUltra continues to operate in the presence of interference which would bring down other wireless networks – providing protection against jamming and helping to answer the challenge of battlefield frequency coordination.

DTC's MeshUltra Tactical IP Mesh waveform means that data can be exchanged between wireless Nodes in point-to-point or, more commonly, point-to-multipoint and multipoint-to-multipoint configurations. When one node can no longer operate, the rest of the nodes continue to communicate with each other –



Clockwise top: Mazagaon Dockyards; DTC Products Display at DSEI 2019 and Goa Shipyard

there is no Network "Master" and no single point of failure.

India was not far behind in terms of participation at Defence and Security Equipment International 2019. There was an India Pavilion at the DSEI London and DPSUs like Garden Reach Shipbuilders and Engineers Ltd (GRSE), Goa Shipyard and Mazagon Dock Shipbuilders Limited (MDSL) actively participated during the event. Mazagon Dock signed a Memorandum of Understanding (MoU) with ASMAR Shipyards of Chile whereas GRSE received a number of foreign delegates at its stall.

Defence engineering Skills Conference (DESC) was also organised at the Indian Pavilion with a focus session on lateral entry and the shift of skill requirements in the digital age. DefExpo2020 also marked its presence at DSEI, one of the world's largest arms fairs. DefExpo2020 is scheduled to be held at Lucknow from February 5-8, 2020. With increasing number of global defence and security companies

FOR THE FIRST TIME, HENSOLDT SHOWED ITS NEWLY DEVELOPED SETAS ELECTRO-OPTICAL SITUATIONAL AWARENESS SYSTEM FOR ARMoured VEHICLES IN OPERATION. ALONGSIDE SETAS, DSEI WITNESSED HENSOLDT'S CAPABILITY IN THE LAND DOMAIN WITH SEVERAL ADVANCED OPTRONIC SYSTEMS

in every edition, this year's DSEI 2019 witnessed more than 1600 exhibitors, 35000 plus attendees, above 50 nations along with 40 international pavilions.

DSEI is a world leading event that connects governments, national armed forces, industry thought leaders and the global defence & security supply chain on an unrivalled scale. With a range of valuable opportunities for networking, a platform for business, access to relevant content & live-action demonstrations, the DSEI community can innovate, share knowledge, discover & experience the latest capabilities across the Aerospace, Land, Naval, Security & Joint domains. ■

APPOINTMENTS

LT GEN MM NARAVANE ASSUMES APPOINTMENT OF VCOAS

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ew Delhi. Lt Gen Manoj Mukund Naravane assumed the charge of Vice Chief of the Army Staff (VCOAS) on September 1. He succeeds Lt Gen Devraj Anbu who after an illustrious career, superannuated on August 31. Before this, the General Officer was heading the Eastern Command of the Indian Army. Lt Gen Naravane is an alumnus of the National Defence Academy and the Indian Military Academy. He was commissioned into the 7th Battalion, The Sikh Light Infantry Regiment in June 1980. He brings with him an enormous amount of experience in serving in the most challenging areas.



In a distinguished military career spanning almost four decades, he has the distinction of tenantry key appointments in active Counter Insurgency environments, both in the North East and in Jammu and Kashmir & was a part of the Indian Peace Keeping Force in Sri Lanka during Operation PAWAN.

He also served as Defence Attache at the Indian Embassy in Myanmar for three years. He is a highly decorated and accomplished officer and has been awarded the 'Sena Medal' (Distinguished) for command of his Battalion in J&K, the 'Vishisht Seva Medal' for his services as the Inspector General Assam Rifles (North) in Nagaland, the 'Ati Vishisht Seva Medal' for command of a prestigious Strike Corps and was honoured with 'Param Vishisht Seva Medal' for his distinguished services as the GOC-in-C of the Army Training Command.

ALEXANDRE ZIEGLER NAMED SAFRAN SENIOR EXECUTIVE VICE PRESIDENT, INTERNATIONAL AND PUBLIC AFFAIRS

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aris. Alexandre Ziegler has been named Senior Executive Vice President, International and Public Affairs, effective September 2. He replaces Stéphane Abrial, who has retired. Ziegler also becomes a member of Safran's Executive Committee. Safran's International and Public Affairs department is also in charge of Group programs, as well as relations

with Boeing, Airbus and COMAC.

A career Diplomat, Ziegler's first assignment was as advisor to the strategic, security and disarmament affairs division of the French Ministry of Foreign Affairs (1997). He held a series of positions (Deputy Counsel General in Hong Kong, First Secretary, then Second Counselor in Berlin, and Counselor for Culture and Cooperation in Beijing) between 2000 and 2010. He was then appointed head of programs and network at the Globalization, Development and Partnerships division in the Ministry of Foreign Affairs and later on joined the cabinet of the Minister of Foreign and European Affairs as chief of staff at the Ministry of Foreign Affairs. Prior to joining Safran, he was the French Ambassador to India.

Ziegler, 49, holds a graduate degree in history from the ENS Lettres et sciences humaines (1992), as well as degrees from Sciences-Po Paris (1993) and the Ecole Nationale d'Administration (1995-1997).



MICAEL JOHANSSON

New Delhi. Saab's Board of Directors has appointed Micael Johansson as President and CEO of the company. Micael Johansson will take up his position on October 23, replacing Håkan Buskhe, who earlier had announced his resignation as CEO. Micael Johansson has been deputy CEO and Senior Executive Vice President of Saab since January 2017. Micael Johansson started his career at Saab in 1985 and has held several executive positions within the company, including head of business area Surveillance. Micael Johansson was born in 1960 and holds a degree in mathematics and computer science from Uppsala University.

"Saab is a large Swedish high-tech company. We were founded to support Sweden's defence capabilities and that is still the core of our mission.

PAVAN KAPOOR APPOINTED NEXT INDIAN AMBASSADOR TO UAE



New Delhi. Senior Indian Foreign Service (IFS) officer Pavan Kapoor has been appointed as the next Ambassador of India to the United Arab Emirates (UAE). A 1990-batch IFS officer, Mr Kapoor has served in different capacities in the Indian Missions in London, Kyiv, Moscow and Geneva.



DR AJAY KUMAR APPOINTED DEFENCE SECRETARY

New Delhi. Senior Indian Administrative Service (IAS) officer Dr Ajay Kumar has been appointed as Defence Secretary in the Ministry of Defence (MoD). Dr Kumar is a 1985-batch IAS officer of Kerala cadre. He replaces Sanjay Mitra who is from West Bengal cadre belonging to the 1982 batch on completion of his term. The Appointments Committee of the Cabinet (ACC) has approved the appointment of Dr Kumar for the post.



SUBHASH CHANDRA APPOINTED AS SECRETARY, DEFENCE PRODUCTION

New Delhi. Senior Indian Administrative Service (IAS) officer Subhash Chandra has been appointed as Secretary, Defence Production. He replaces Dr Ajay Kumar, who has been appointed as Defence Secretary in the Ministry of Defence. A 1986-batch IAS officer of Karnataka cadre Mr Chandra is Special Secretary (Defence) at present.

NEW PRESIDENT AND CEO OF SAAB



Getting to contribute to this work, together with all our talented workforce, is an important responsibility. As President and CEO, I look forward to continue the process of implementing Saab's strategy, and to improve profitability and

cash flow. It is essential to be able to continue investing in rapid technological change, to develop collaborative projects with other companies and to move forward with Saab's internationalization," said Saab's incoming President and CEO Micael Johansson. ■



Adani Group Chairman
Gautam Adani

ADANI SUBMITS LAST MINUTE BID FOR SUBMARINE PROJECT

Adani Group now is contending for all three mega defence acquisition plans under the Government's strategic partnership model - for future fighter jets, naval helicopters and conventional submarines

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ew Delhi. Top industry major Adani Group has made a last-minute entry for a Rs 4,500 crore Indian Navy submarine project by submitting a bid which has taken other contenders by surprise for what is the largest ongoing Make in India initiative in the defence sector. The much-awaited contest was expected to be a faceoff among traditional contenders such as Larsen and Toubro (L&T), Mazagon Dock Shipbuilders Ltd (MDL) and Reliance Naval and Engineering Ltd, all of which own shipyards. The Adani Group does not currently own an active shipyard, which is why the bid has come as a surprise.

Those familiar with the details said the Gujarat-based group could float a special purpose vehicle (SPV) with state-owned

Hindustan Shipyard (HSL), which has experience in submarine repairs and overhauls.

The Adani Group is now a

contender for all three mega defence acquisition plans under the Government's strategic partnership model - for future fighter jets, naval helicopters and conventional submarines. Others that submitted bids for the submarine programme are L&T, MDL and Reliance Naval.

The contract, under which an Indian shipyard will be chosen to manufacture six conventional submarines in collaboration with a foreign partner, is in its initial stages.

Over the next two months, the defence ministry will scrutinise the bids to shortlist qualified Indian contenders.

The formal tender for the contract — after foreign partners from Russia, France, Germany, Spain and Sweden are selected as part of a parallel process — is expected by the end of the year. At the earliest, the submarine contract can be awarded to the winning contender after two years.

The single biggest shipbuilding plan under the strategic partnership model is expected to see state owned MDL as the frontrunner, given its experience in building the Shishumar class of submarines as well as the current production line for the Kalvari (Scorpene)

THE ADANI GROUP HAS AMBITIOUS PLANS IN DEFENCE, WITH ITS ACQUISITION LATE LAST YEAR OF BENGALURU-BASED ALPHA DESIGN TECHNOLOGIES PVT LTD THAT HAS A STRONG ORDER BOOK AND TIEUPS WITH BIG RUSSIAN AND ISRAELI COMPANIES

class of boats.

The Adani Group has ambitious plans in defence, with its acquisition late last year of Bengaluru-based Alpha Design Technologies Pvt Ltd that has a strong order book and tieups with big Russian and Israeli companies.

The acquisition has enabled Adani to get involved in the specialised defence and space business. Its product list now ranges from drones to helicopters and simulators. It's also one of the major suppliers for the indigenous Light Combat Aircraft (LCA) programme.

The acquisition placed Adani Defence and Aerospace in the big league that includes the Tata Group, Mahindra & Mahindra, Reliance Defence and L&T, which are vying for large Make-in-India projects under the strategic partnership scheme. Adani unveiled a manufacturing facility in Hyderabad last year to make Hermes 900 drones in collaboration with Israel's Elbit Systems. ■



IN NEWS

AMIT SHAH, SINGAPORE HOME MINISTER DISCUSS BILATERAL, REGIONAL ISSUES OF MUTUAL INTEREST

New Delhi. Union Home Minister Amit Shah and the Minister for Home Affairs and Law of Singapore K Shanmugam met in New Delhi on August 31 and discussed bilateral and regional issues of mutual interest. Amit Shah noted that India-Singapore relations are based on shared values and approaches, economic opportunities and convergence of interest on key issues. Home Minister Shanmugam, on his part, also emphasised the importance Singapore attaches to its relations with India. The two leaders also exchanged views and concerns on the challenges posed by terrorism and extremism. They agreed to strengthen the existing bilateral institutional mechanisms on security issues.



DAC APPROVES CAPITAL PROCUREMENT OF ABOUT RS 2,000 CR

New Delhi. With focus on Make in India initiative of the Government, the Defence Acquisition Council (DAC) chaired by Defence Minister Rajnath Singh on September 13 cleared capital procurement for the Services to the tune of about Rs 2,000 crores. It accorded approval for indigenous development and production of the main gun 125 mm Armour Piercing Fin Stabilised Discarding-Sabot (APFSDS) ammunition for T-72/T-90 tanks by the Indian industry, which would substantially enhance the enemy armour penetration capability. The Council also approved procurement of Defence Research and Development Organisation (DRDO) developed and industry manufactured Mechanical Mine Layer (Self Propelled) to improve automated minelaying capability with the Indian Army.

INDIA, CHINA DAY LONG STANDOFF ALONG PANGONG LAKE IN LADAKH ENDS

New Delhi. A day long standoff between Indian and Chinese soldiers in eastern Ladakh that lasted all day on September 11 was resolved through delegation-level talks, Army sources said. Indian soldiers were patrolling at the northern bank of Pangong lake in the morning when they were stopped by Chinese soldiers, according to a media report. Two-thirds of the lake in the high-altitude region that extends from Tibet to Ladakh is controlled by China. Soon, the standoff between the two sides started, with both calling in reinforcements and it continued till the evening, the report said.



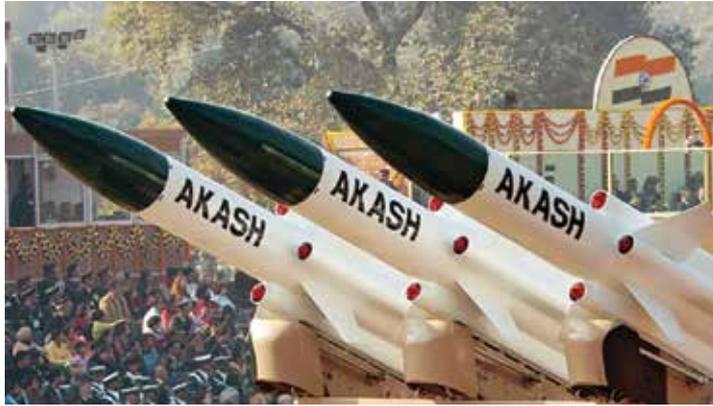
“The matter has been de-escalated and disengaged fully after delegation-level talks yesterday (September 11). This occurs due to differing perceptions of LAC (Line of Actual Control). There are established mechanisms to resolve such occurrences,” an Army source said. This is not the first time that a standoff has been reported between Indian and Chinese soldiers around Ladakh’s Pangong lake, a site that also draws a lot of tourists. The two-hour-long standoff was brought under control after a drill which sees both sides holding up banners proclaiming their rights over the disputed area before stepping back to their respective positions. Then also, Brigadier level officers met and try to find a way to bring down tensions in the region, as was done on September 11.

GOVERNMENT CLEARS PROCUREMENT OF 6 SQUADRONS OF AKASH AIR DEFENCE MISSILE

New Delhi. With increasing threat perceptions on two fronts, the Government on September 5 cleared the procurement of six squadrons of the indigenous Akash air defence missile systems worth Rs 5,000 crore to boost to Indian Air Force's capability to take down enemy fighter aircraft. These are to be deployed on the borders with Pakistan and China.

"The Cabinet Committee on Security (CCS) headed by Prime Minister Narendra Modi recently cleared the project for the Air Force. The Defence Ministry informed the Air Force about the Government decision today," government sources said.

The three-year-old proposal for the acquisition of the Akash missiles is being seen as the whole-hearted acceptance of the indigenous missile system among the armed

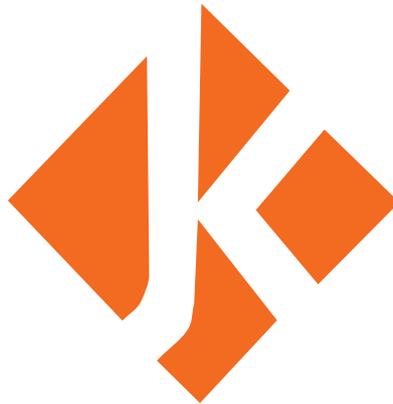


forces as this clearance would increase the number of Akash systems ordered for the Air Force to 15. The initial order for the Akash by the Air Force was for two squadrons and the increased orders show the faith it has in the system, they said.

During an exercise in Surya Lanka held last year, the Akash missile system was

tested along with all other air defence missiles including Israeli ones in the Air Force inventory and it came out as the best performer. Akash missile has been chosen by the Defence Ministry over foreign systems also as the Government scrapped an Army tender worth over Rs 17,000 crore to favour Akash. The missile proposal has been cleared for the Air Force after the service felt the need for

more such weapon systems in wake of the February 27 post-Balakot strike scenario when Pakistan launched a counter-attack. With more Akash systems on the ground, next time Pakistan tries anything like this, it will have to face the ground-based missiles also along with the air defence fighters.



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IN NEWS



INDIA NEEDS MORE R&D AND INNOVATION: DEFENCE MINISTER

New Delhi. There is need for India to focus more on Research and Development (R&D), innovation and creation of cutting-edge technologies to become self-reliant in defence production, said Defence Minister Rajnath Singh. Inaugurating the seventh edition of Engineers Conclave in Bengaluru on September 19, he said this year's conclave is based on two themes, 'Defence Technology & Innovation' and 'Transformation of Rural India Using Digital Technologies'. Singh said the Indian defence industry had not performed to its full potential in the past that led to the country's overwhelming dependence on imported arms. He emphasised that developing critical and cutting-edge technologies indigenously will make the country self-sufficient, saving the precious foreign exchange, which could be utilised in other development activities in the country. He described continuous innovation as the key to success for any nation, given the fast pace at which technology becomes obsolete every passing day.

PAKISTAN HAS NO LOCUS STANDI IN J&K: DEF MIN

New Delhi. Defence Minister Rajnath Singh has said Pakistan has no locus standi in Jammu & Kashmir and it should stop making statements on the internal matters of India. He was addressing farmers, security personnel and scientists after inaugurating the 26th Ladakhi Kisan Jawan Vigyan Mela organised by Defence Institute of High-Altitude Research (DIHAR) at Leh on August 29.

The Defence Minister said, "I would like to ask Pakistan, when was Kashmir a part of you? Kashmir was always a part of India". Rajnath Singh said, "Our stand on Jammu & Kashmir has always been clear and added that in February 1994, Parliament unanimously passed a resolution on J&K."

He also said, Pakistan has illegally occupied PoK including Gilgit-Baltistan and instead of speaking on Kashmir it should look into the human rights violations the people are facing in that region.



IAF GETS 11TH C-17 GLOBEMASTER III

New Delhi. In a boost to the current and future strategic airlift capability, Indian Air Force (IAF) has received its 11th C-17 Globemaster III. This is a premier transport aircraft which is huge, sturdy and long-haul aircraft can be used for military, humanitarian and peacekeeping missions. It is also capable of carrying large combat equipment, troops and humanitarian aid across long distances. It's an all weather aircraft and can operate in any terrain. The C-17 has been playing a very critical role for the IAF as it has enhanced strategic and combat airlift capability of the service. These aircraft have carried out a wide range of operations in military missions, and provided peacekeeping support. Since induction to the Sky Lords squadron in 2013, the aircraft has been used in humanitarian assistance and disaster relief in India and internationally. The US based aerospace Boeing Company has been maintaining IAF's C-17 fleet through techno-logistics support. The fleet has maintained high rate of serviceability and the company has also trained aircrew that operate the platform.

PRIVATE SECTOR GETS BOOST IN DEFENCE INDUSTRY

New Delhi. In a major boost to Indian private defence industry, state-run Hindustan Aeronautics Limited (HAL) has outsourced works on the Light Combat Aircraft (LCA) Tejas Mark 1A to companies like Larsen and Toubro, Dynamic Technologies and Alpha Design. It clearly indicates that HAL will now be more of a systems integrator, with private companies playing a major role in the manufacturing of fighter aircraft and other aviation assets, including helicopters. According to the plan, the wings for the next generation of the Tejas aircraft, orders for which are yet to be placed by the Indian Air Force (IAF), will now be manufactured by Larsen and Toubro (L&T). The front fuselage of Mark 1A has been outsourced to Dynamic Technologies, the middle section to VEM, and rear section to Alpha Design, sources in HAL said about their preparations for the project.



LOCKHEED MARTIN CONGRATULATES DEFENCE ESTABLISHMENT ON “ARREST LANDING”

New Delhi. American aerospace giant Lockheed Martin congratulated the Indian defence establishment for carrying out a successful “arrest landing” of India’s indigenously developed Light Combat Aircraft (LCA) Tejas saying that the company is looking forward to support the Indian Navy’s LCA programme. Vice president of Strategy and Business Development at Lockheed Martin Dr Vivek Lall described the landing as a “significant engineering feat” that should be celebrated. “Lockheed Martin is fully committed to India and we look forward to supporting the LCA Navy programme if desired given our breadth and depth of expertise in that area,” he said. “The F-21 would be a game-changing US and India win. An F-21 partnership with Lockheed Martin integrates Indian industry into the world’s largest and most advanced fighter aircraft ecosystem,” Dr Lall said.



LCA TO GRADUATE TO NEXT LEVEL WITH OBOX

New Delhi. In yet another feather in its cap, the indigenously-built Light Combat Aircraft (LCA) Tejas will be graduating to the next level with the installation of the On-board Oxygen (OBOX) generating system by December or early 2020, said a scientist from Defence Electromedical & Bio-Engineering Laboratory (DEBEL) under Defence Research and Development Organisation (DRDO). Almost a year after successful mid-air fuelling of the Tejas, the LCA Mark-1 (Mk-1) of the Indian Air Force, which enables aircraft to be airborne for longer durations, DEBEL researchers have developed the onboard oxygen generating system, OBOX, to help keep the pilot fit and alert for an equally long duration with continuous supply of oxygen while on high altitude, long-distance flights. The IAF had initially ordered 40 LCA Tejas aircraft with Hindustan Aeronautics Limited (HAL), which is manufacturing the aircraft after the Aeronautical Development Agency (ADA) completed its design and development phase. However, in 2018, the IAF placed a further order of 83 LCA Tejas aircraft at a cost of about Rs 50,000 crore.

DEFENCE MINISTER MAKES HISTORY BY FLYING IN LCA TEJAS AS FIRST DEFENCE MINISTER

New Delhi. It was “thrilling and special” what Defence Minister Rajnath Singh who scripted history on September 19 by becoming the first Defence Minister to fly the fourth-generation indigenously built Light Combat Aircraft (LCA) ‘Tejas’ described his 30-minute sortie. Singh flew in the indigenously-built multi-role fighter aircraft with Air Vice Marshal Narmadeshwar Tiwari at the Hindustan Aeronautics Limited (HAL) Airport in Bengaluru the same day. Congratulating HAL, Defence Research and Development Organisation (DRDO) and Aeronautical Development Agency (ADA) for building the multi-role fighter aircraft, the Minister said demand has been received for ‘Tejas’ from different countries. He expressed pride that India has reached a stage where fighter aircraft and arms and ammunition can be exported to the world.



NEW DELHI HOSTS 12TH INDIA SECURITY SUMMIT ON “TOWARDS NEW NATIONAL CYBER SECURITY STRATEGY”

New Delhi. The 12th India Security Summit on the theme “Towards New National Cyber Security Strategy” was held in New Delhi on August 28. During the conference, many issues were discussed such as protection of critical national infrastructure, emerging cyber threats: incidents, challenges and response. Addressing the gathering, Minister of State (MoS) in the Prime Minister’s Office Dr Jitendra Singh said Indian society has gone through rapid evolution as far as technology, special communication technology is concerned. He said that ‘digital culture’ is being transferred from generation to generations.

Dr Singh said that every technology has a utility; similarly cyber technology is a big boom nowadays. But besides being a boon the same technology has become one of the greatest threat, he added. He also mentioned about the cyber threat in the wake of national security.

Speaking on the occasion, the Minister of State (MoS) for Home Affairs G Kishan Reddy said: “We live in a digital world. He said that security is one of the challenging areas that all of us have to think upon. As we are adopting different technologies, we are also facing different challenges particularly on cyber security.” Cyber security is the need of the hour for cyber safe society, the Minister said. New tools and technologies must be developed at faster rate for cyber security, he observed.



SAAB RECEIVES FINNISH SQUADRON 2020 ORDER

New Delhi. Saab has signed a contract with the Finnish Defence Forces Logistics Command, and received an order to provide and integrate the combat system for the Finnish Navy's new Pohjanmaa-class corvettes within the Squadron 2020 programme. This follows the previously announced selection on September 19. The order value is 412 million Euro and the contract period is 2019-2027. The Finnish shipyard RMC Defence will build the Finnish Navy's four new corvettes, with construction 2022 to 2025. The corvettes will be fully operational by 2028. "We are proud that Finland has chosen Saab as combat system provider and integrator for their new corvettes. Saab has a long history in Finland and the Squadron 2020 contract means that we will increase our footprint in and deepen our relationship with Finland for many years to come", says Micael Johansson, Senior Executive Vice President and Deputy CEO at Saab. The contract includes, among other things, Saab's Combat Management System (9LV) and Saab's radars Sea Giraffe 4A Fixed Face and Sea Giraffe 1X. The communication system TactiCall as well as the remote weapon station Trackfire, are also included in the contract. "This is going to be the world's most modern and advanced corvettes, with state of the art technology and capabilities, including the 9LV Combat Management System and the integrated mast featuring Saab's sophisticated Sea Giraffe 4A Fixed Face radar and the Sea Giraffe 1X radar", continues Micael Johansson. Saab will carry out the work in Sweden, Finland, Denmark, Australia and South Africa.

BOEING AWARDED \$2.6 BILLION FOR FIFTH KC-46A TANKER PRODUCTION LOT

EVERETT, Washington. The US Air Force on October 1 awarded Boeing a \$2.6 billion contract for 15 KC-46A tanker aircraft, spares, support equipment, spare engines and wing air refueling pod kits. With this fifth production lot, Boeing now is on contract for 67 KC-46 tankers. Boeing received its first two production lots, for 7 and 12 aircraft, in August 2016. The third lot, for 15 aircraft, was awarded in January 2017; the fourth lot for 18 aircraft in September 2018. "We're honored to build the Air Force's next-generation tanker and appreciate the importance of this program for our nation," said Jamie Burgess, Boeing KC-46A tanker vice president and program manager. "This has been a milestone year for KC-46 and a big reason for that is our great partnership with the Air Force. We expect to accomplish great things together in the years to come." Boeing plans to build 179 of the 767-based refueling aircraft for the Air Force to replace its legacy tanker fleet. The company delivered the first tankers to the Air Force in January 2019. Boeing received its initial contract in 2011 to design and develop the Air Force's newest tanker aircraft. The KC-46A is a multirole tanker that can refuel allied and coalition military aircraft compatible with international aerial refueling procedures and can carry passengers, cargo and patients. Boeing is assembling KC-46 aircraft at its Everett, Wash., facility and recently started production of the first KC-46 for Japan.



GENERAL ATOMICS AWARDED ARMY CONTRACT SUPPORTING HYPERSONIC GLIDE BODY PROTOTYPE DEVELOPMENT

SAN DIEGO, CA. General Atomics Electromagnetic Systems (GA-EMS) announced on October 1 that it has been awarded a contract by the US Army's Rapid Capabilities and Critical Technologies Office (RCCTO) to further the development of the Common Hypersonic Glide Body (CHGB) and Flight Test Vehicle in support of the Army Long Range Hypersonic Weapon (LRHW) and the Navy's Intermediate Range Conventional Prompt Strike (IRCPS) Program. The contract award follows work performed by GA-EMS under a previous contract with the U.S. Army Space and Missile Defense Command for the Advanced Hypersonic Weapon – Technology Demonstration program. "As new threats continue to emerge, advancing the development and flight testing of hypersonic vehicle prototypes has become an urgent priority," stated Scott Forney, president of GA-EMS. "Over the past 13 years, we have worked closely with the Army and Sandia National Laboratories to design, manufacture and test hypersonic glide body components and technologies. We look forward to leveraging that expertise as this critical capability transitions out of the lab and into a production-ready asset to support the warfighter." GA-EMS will provide manufacturing, production, engineering and technical support to integrate, test, and evaluate CHGB and Flight Test Vehicles through system and subsystem-level ground and flight test activities. Deliverables include the manufacture of components, test and integration of vehicle flight components and assemblies, flight test planning and execution, and simulation, validation and verification support.



RAYTHEON DEVELOPING FINAL PHASE OF ELECTRONIC WARFARE PLANNING AND MANAGEMENT TOOL

EL SEGUNDO, Calif. Raytheon is developing Capability Drop 4 of the Electronic Warfare Planning and Management Tool, or EWPMT, under a multi-million dollar contract from the US Army over the next 24 months. EWPMT is a first-of-its-kind tool that plans, manages and controls sensors and systems in the electromagnetic spectrum, providing critical information about what is happening in a crowded signal environment. Delivered in what the Army calls Capability Drops, CD4 represents the final stage of a fully operating capability, or Increment 1. "EWPMT gives the Army the freedom to add new capabilities and algorithms so they can manage an increasingly complex electromagnetic spectrum," said Niraj Srivastava, product line manager for Raytheon Electronic Warfare Systems. "And because it uses open architecture, the tool can be shared with other military services."

Open architecture also allows the tool to execute cyber effects in multi-domain operations. Raytheon delivered CD1 and CD2, and is currently working on CD3, which addresses using the tool in a tactical environment against threats. CD3 also includes all of the functionality of Raytheon's Raven Claw, a mobile version of EWPMT that helps operators control signals in the field even without a host server or reliable connection to external data. Under the CD4 contract, Raytheon will continue to develop software and the user interface for a more connected, mobile system.



GENERAL DYNAMICS ENHANCES LCS 10 WITH NEW ANTI-SHIP AND LAND ATTACK CRUISE MISSILE SYSTEM

FAIRFAX, Virginia. General Dynamics Mission Systems announced on September 26 that it has integrated a new over-the-horizon missile capability onto the Independence-variant Littoral Combat Ship (LCS) in support of a Chief of Naval Operations mandate to increase LCS lethality and survivability.

The integration of the MK 87 Mod 0 over-the-horizon Naval Strike Missile (NSM), aboard the USS Gabrielle Giffords (LCS 10), strengthens the ship's mission readiness and defensive capabilities. General Dynamics was able to integrate the NSM system by determining equipment placement, adapting the ship's navigation system to provide unique signals to the missile system, designing the operational station in the Integrated Command Center, designing the system for providing specialized power to the MK 87 and conducting all of the analyses necessary for a safe and effective system. The General Dynamics team, including Austal USA, designed structures and foundations and accomplished the installation in San Diego.

"The open-architecture design of the ship's computing environment and electronic systems made the design and integration of the new NSM



system feasible in an accelerated timeline," said Carlo Zaffanella, vice president and general manager of maritime and strategic systems at General Dynamics Mission Systems.

The NSM, produced by Kongsberg and managed in the US by Raytheon, is a long-range, precision-strike weapon that can find and destroy enemy ships at distances up to 100 nautical miles.

In addition to the USS Gabrielle Giffords, General Dynamics will serve as the prime contractor for the integration and installation of the NSM capability on all Independence-variant LCSs already in service.

General Dynamics is the Independence-variant LCS systems integrator, responsible for the design, integration and testing of the navigation, command, control, computing, and aviation systems on each ship. LCS ships are designed to be agile, mission-focused platforms capable in operating in near-shore and open-ocean environments. They are designed to defeat asymmetric anti-access threats such as mines, quiet diesel submarines and fast surface craft.

General Dynamics Mission Systems is a business unit of General Dynamics.

INDIA TO ACHIEVE \$26 BILLION DEFENCE INDUSTRY BY 2025



New Delhi. Defence Minister Rajnath Singh said the Government is committed to work towards achieving a US dollar 26 billion defence industry by 2025.

Addressing the second annual session of Society of Indian Defence Manufacturers (SIDM) in New Delhi on September 17, he said the defence sector has been identified as one of the most prominent sectors under Make in India Initiative to realize US dollars 5 Trillion Economy by 2024.

Underlining the need to reduce dependency on arms imports, he said several steps have been taken under Make in India initiative to make the country a major defence manufacturing hub and net defence exporter. The Government would not hesitate to initiate more measures, if required, he said.

Singh said the defence production policy reflects the resolve of the government to achieve US dollar 26 billion defence industry with an anticipated investment of US dollar 10 billion in aerospace and Defence goods and services by 2025. This will also provide employment to about two to three million people.

He said, the government has introduced many far-reaching reforms in the past five and a half years to create an ecosystem where private and public sectors contribute together as per their respective strength and experience. The reforms have touched almost all aspects of Defence production and procurement, he added.

Singh said that simplification of procedures for Defence Exports has resulted in export of Rs 10,745 Crore in 2018-19, which is nearly seven times the export achieved in 2016-17 and a target of US dollars five Billion for exports has been set till 2024.



BOEING MQ-25 UNMANNED AERIAL REFUELER COMPLETES 1ST TEST FLIGHT

ST LOUIS. Boeing and the US Navy on September 19 successfully completed the first test flight of the MQ-25™ unmanned aerial refueler. The MQ-25 test asset, known as T1, completed the autonomous two-hour flight under the direction of Boeing test pilots operating from a ground control station at Mid America St Louis Airport in Mascoutah, Ill., where the test program is based. The aircraft completed an autonomous taxi and takeoff and then flew a pre-determined route to validate the aircraft's basic flight functions and operations with the ground control station. "Seeing MQ-25 in the sky is a testament to our Boeing and Navy team working the technology, systems and processes that are helping get MQ-25 to the carrier," said Boeing MQ-25 Program Director Dave Bujold. "This aircraft and its flight test program ensures we're delivering the MQ-25 to the carrier fleet with the safety, reliability and capability the US Navy needs to conduct its vital mission." The Boeing-owned test asset is a predecessor to the engineering development model (EDM) aircraft and is being used for early learning and discovery to meet the goals of the US Navy's accelerated acquisition program. Boeing will produce four EDM MQ-25 air vehicles for the US Navy under an \$805 million contract awarded in August 2018.

IAF TECHNICALLY ACCEPTS FIRST DASSAULT-MADE RAFALE FIGHTER AIRCRAFT

New Delhi: Almost a fortnight before the first Rafale fighter aircraft is formally handed over to India on October 8 to Defence Minister Rajnath Singh at a function by the French Dassault Aviation, Indian Air Force (IAF) "technically accepted" the jet with the tail number 'RB-001' to mark the role played by IAF chief-designate Air Marshal RKS Bhadauria in finalising Rs 59,000 crore deal in September 2016. The multi-role fighter was accepted by a team led by IAF Deputy Chief Air Marshal VR Chaudhari, who also flew in the plane for about an hour. The first four Rafale jets will actually touchdown in Ambala only in May next year after training of the "main" induction team of around 10 pilots, 10 flight engineers and 40 technicians in France. All 36 jets – eight of them twin-seaters – will be delivered by April 2022. IAF has resurrected its 17 'Golden Arrows' Squadron at Ambala for the first 18 Rafale jets meant for the western front with Pakistan. The 101 "Falcons" Squadron, in turn, will have the next 18 jets based at Hasimara (West Bengal) near the Sino-Indian border. The 13 India-Specific Enhancements or upgrade on the 36 jets will, however, become fully operational only by September-October 2022 because they will require another six months to undergo "software certification" after all of them have arrived in India.



IAF GETS SPICE-2000 BOMBS



New Delhi. Indian Air Force (IAF) got a major boost to its fire power when it received the 'building blaster' version of the Balakot air strike-fame Spice-2000 bombs at the Gwalior airbase which is the home base of IAF's Mirage 2000 fighter aircraft fleet. The Indian Air Force has signed an over Rs 250 crore contract with Israel with Mark 84 warhead and bombs which can destroy buildings completely. The contract was inked in June this year for acquiring more than 100 Spice-2000 bombs under the emergency procurement powers of the services given by the Narendra Modi government. The contract was signed as the Air Force wanted to acquire the bombs after their successful usage in the Balakot airstrikes against a Jaish-e-Mohammed (JeM) terrorist camp in Pakistan. During the Balakot strikes, the Air Force had dropped Spice-2000 bombs from Mirage-2000 fighter aircraft after a pack of 12 of these fighters crossed the Line of Control (LoC) to strike the Jaish terror camp in the Khyber Pakhtunkhwa province.

INDIAN NAVY SPY PLANE DETECTS CHINESE AMPHIBIOUS WARSHIP IN SOUTHERN INDIAN OCEAN

New Delhi. Indian Navy's P-8I Poseidon spy planes recently detected Chinese amphibious warship Xian-32 in the southern Indian Ocean region and sent photographs of Landing Platform Dock Xian 32 before it entered Sri Lankan waters, according to reports. According to Indian Navy, "The P-8I tracked another Chinese frigate that is part of its anti-piracy escort task force deployed in Gulf of Aden to provide security to Chinese merchant vessels from Somali sea pirates." This comes almost a fortnight after Indian intelligence agencies warned that China was allegedly spying on Indian Naval bases in the Indian Ocean through its advanced surveillance ship in the Andaman and Nicobar Islands. An intelligence agency report, which was accessed by the media said that China had regularly been sending its surveillance ships in the IOR to gather more details about the Indian naval bases and the warships deployed in the area. The report further said that the Chinese Navy had recently deployed one of its latest intelligence-gathering ships – Dongdiao class ship Tianwangxing – in the IOR to keep an eye on the Indian naval installations. The Chinese spy ship had entered into India's Exclusive Economic Zone (EEZ) and stayed there for a few days. The Chinese spy ship was spotted very close to the eastern sea border near the Andaman and Nicobar Islands, the report said.



IAF WANTS RS 40,000 CRORE FOR MODERNISATION

New Delhi. With top defence officials repeatedly emphasising on the possibility of a two-front war and the need to have an airpower capable of dealing with such a scenario, Indian Air Force (IAF) has sought the need for massive funds for its modernisation. The IAF has sought Rs 40,000 crore from the government for procuring latest weapons even as it faces a severe cash flow problem. It also sought additional money from the government to buy new equipment and also pay for weapons and systems it has already contracted to purchase. The capital expenditure of Rs 39,300 crore earmarked for IAF in this year's budget is not enough to upgrade capabilities and more money needs to be pumped in to avoid a funding crisis with at least Rs 40,000 crore more needed to pursue its modernisation.



MDL DELIVERS SECOND SCORPENE SUBMARINE 'KHANDERI' TO NAVY

New Delhi. Defence Public Sector Undertaking (DPSU) Mazagon Dock Shipbuilders Limited (MDL) in Mumbai on September 19 delivered the second Scorpene class submarine 'KHANDERI' to the Indian Navy. The Acceptance Document was signed by Cmde Rakesh Anand, Chairman & Managing Director, MDL and Rear Admiral B Sivakumar, Chief of Staff Officer (Tech), Western Naval Command in the presence of MDL Directors and Navy personnel at MDL. The submarine would soon be commissioned into the Indian Navy. The technology utilised in the Scorpene has ensured

superior features of the submarine. The Scorpene class of submarines can undertake multifarious tasks typically undertaken by any modern submarine which include anti-surface as well as anti-submarine warfare. With the delivery of Khanderi, India further cements its position as a submarine building nation and MDL has lived up to its reputation as one of India's leading shipyards with a capacity to meet requirements of the Indian Navy by the "Indian commercial and warship building and ship repairing industry report" released in Mumbai during March, 2018 by CRISIL.

BEML, WIPRO SIGN MOU ON AEROSPACE, OTHERS

Bengaluru. Leading state-owned Defence PSU BEML and private sector industry major Wipro Infrastructure Engineering (WIN) inked a Memorandum of Understanding (MoU) on September 16 to work together in aerospace, industrial automation, 3D printing, artificial intelligence and hydraulic system engineering. This is a first-of-its-kind MoU for WIN with a large public sector enterprise in India. The MoU entails working together on projects, products, systems, services and projects in defence, DRDO Labs, DPSUs and other relevant government entities in India as well as export customers. BEML CMD D K Hota said the partnership would help both companies make a significant contribution to indigenisation and 'Make in India' initiatives of the Government of India.



BRAHMOS WITH 65% INDIGENOUS PARTS SUCCESSFULLY TEST FIRED

New Delhi. BrahMos, the world's fastest supersonic cruise missile, was successfully test-fired in Odisha's Balasore district on September 30. The biggest benefit of the test which met all flight parameters was that the lethal missile had more than around 65 per cent 'Make in India' components. The BrahMos missile has been jointly developed by Russia and India and has a strike range of under 300 kilometres. Some of the major 'Make in India' components in the latest BrahMos missile are; airframe, propulsion system, power supply. According to officials, the increasing 'Make in India' percentage of the BrahMos missile is a big boost for the defence sector's indigenisation programme. BrahMos is said to be one of the most potent anti-ship cruise missiles in the world and it has already been operationalised with all the three services of the Indian Armed Forces. The BrahMos has been integrated on the Sukhoi-30 MKI fighter jet. It is said to be the heaviest missile to have been integrated on the frontline fighter jet in the world. A lighter version of BrahMos, the BrahMos NG, is being developed for integration on the Light Combat Aircraft (LCA) Tejas.

INDIGENOUS FIGHTER AIRCRAFT LCA NAVAL COMPLETES FULL CYCLE

New Delhi. Technology in defence took a major step forward when indigenous aircraft LCA Naval Prototype-2 on September 29 launched off the ski jump at 1621 hours and subsequently "trapped" at 1631 hours on the arresting gear site of an aircraft carrier with both at Shore Based Test Facility INS Hansa in Goa. While both these activities had been achieved individually earlier, this was the first occasion when the complete cycle of launch and recovery necessary for aircraft carrier operations was accomplished in a single sortie. Being a pioneering technology acquisition and demonstration programme for the unique Short Take-Off but Arrested Recovery (STOVAR) concept of aircraft operations, the LCA (Navy) team has had to conceptualise and experiment with complex software modes from a clean slate.

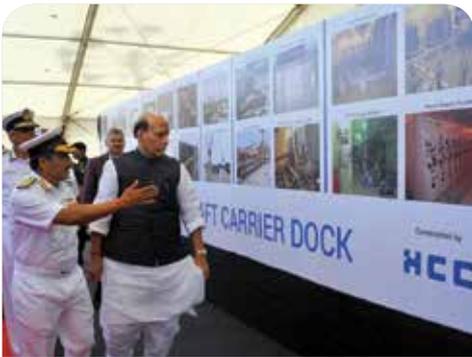


UP PLANS DEFENCE MANUFACTURING CORRIDOR ON BUNDELKHAND EXPRESSWAY



Mumbai. As part of move to boost the state, the Uttar Pradesh (UP) government is planning to set up a defence manufacturing corridor along the proposed Bundelkhand expressway, Chief Minister Yogi Adityanath said. "A defence expo will be organised in February 2020, in which more than 100 countries have confirmed their participation. Uttar Pradesh will contribute in making India self-reliant in defence production," he said.

Talking about infrastructure development in the State, Adityanath said: "Besides Bundelkhand expressway, construction of the Meerut-Prayagraj expressway will commence next year. Each of the 75 districts will have four-lane connectivity. Before 2017, only two cities (in UP) had air connectivity and now the number has gone up to six. Eleven new airports and two international greenfield airports have been planned. Three cities have Metro system."



DRY DOCK FOR AIRCRAFT CARRIER IN MUMBAI LAUNCHED

New Delhi. It was indeed an engineering feat that cost the Navy Rs 1,320 crore, the dry dock — measuring 281 metres in length, 45 metres in width and 16.7 metres in depth — allowing multiple ship-docking, including two submarines at the same time as also for an aircraft carrier that was launched by Defence Minister Rajnath Singh in Mumbai. While the Mumbai dockyard had three existing British era dry docks, they could not accommodate an aircraft carrier which is bigger in size and displacement as compared to any regular ship. The new dry dock has a unique design involving construction into the sea rather than utilising the limited land available in the Naval Dockyard in Mumbai. “It is a huge capability enhancement for the Navy. Earlier, we had to depend on the Kochi Shipyard for INS Vikramaditya which involved some waiting period since arrangements had to be made. However, the Navy will now have its own facility,” a senior Navy officer said. The Navy currently has dry dock facilities in Mumbai and Visakhapatnam, and a ship lift facility in Karwar. However, none could accommodate an aircraft carrier.

DRDO STRESSES ON INDIGENOUS DEFENCE PRODUCTION

New Delhi. Shillong: There is a need to improve indigenous defence production emphasised Defence Research and Development Organisation (DRDO) Chairman G Satheesh Reddy in Shillong on September 28 saying that the country must focus on more indigenous defence production to reduce import in the sector and should become self-reliant in technology. Indigenous produce in defence manufacturing is currently about 45-50 per cent only, he said. “Our indigenous produce in defence (sector) is close to 45-50 per cent only. We have a lot of imports. We need to improve (the share of indigenous production) and work on new technologies,” Reddy said. He said the research organisation, engaged in developing defence technologies, should become a technology leader and it has a lot to do to ensure that the country reduces its imports in defence sector.



ROSOBORONEXPORT ORGANIZES RUSSIA'S DISPLAY AT THE FIRST DSE VIETNAM 2019

Moscow. Rosoboronexport (part of the Rostec State Corporation) is the organiser of Russia's joint display at the first International Defense & Security Expo Vietnam 2019 (DSE), which was held from October 2 to 4 at the International Exhibition Center in Hanoi, Vietnam.

“Rosoboronexport has accepted with appreciation the invitation of the organizers to exhibit at DSE 2019 and decided to support the debut exhibition in Vietnam, Russia's key partner in Southeast Asia. Military-technical cooperation between our countries has been ongoing since 1953, and today it involves the widest possible range of weapons and military equipment. As part of the modernization of its national armed forces, Vietnam has become one of the major customers of Russian products, and we are pleased to note that, despite growing competition, our weapons are still the preferred choice here,” said Rosoboronexport's Director General Alexander Mikheev. At DSE 2019, Russia's joint display encompasses stands of Rostec's subsidiaries Rosoboronexport (Stand E71), NPK Uralvagonzavod (Stand E81), NPO Splav (Stand D71) and Research Institute of Applied Chemistry (Stand D71). In addition, the Russian delegation includes representatives of 12 Russian defense enterprises to participate in the business program of the exhibition.

LUH SUCCESSFULLY TESTED IN HIGH WEATHER CONDITIONS IN HIMALAYAS: HAL

Bengaluru. Light Utility Helicopter (LUH) designed and developed by defence Public Sector Undertaking (PSU) Hindustan Aeronautics Limited (HAL) successfully demonstrated high altitude capability in hot and high weather conditions in the Himalayas. The trials were carried out by the test pilots from HAL, IAF and the Army from August 24 to September 5.

The LUH has complied with all the requirements of the users and with the completion of hot and high altitude testing; it is close to operational clearance certification, said R Madhavan, CMD, HAL. The LUH completed hot weather trials at Nagpur in 2018, cold weather trials at Leh in 2019, sea level trials at Chennai in 2018 and at Puducherry in 2019.



MAJOR BOOST TO DOMESTIC DEFENCE INDUSTRY, INDIA BEGINS TO EXPORT BULLETPROOF JACKETS

Two PSUs MIDHANI and Ordnance Factory at Avadi, Chennai and private firms SMPP (Palwal), Starwire (Faridabad) in Haryana and MKU (Kanpur) in Uttar Pradesh are Mfg bulletproof jackets as per the BIS norms



ew Delhi. In a major boost to domestic defence industry India has begun exporting bulletproof jackets as per its own standards, which conform to international norms, to over 100 countries including European nations. A top Bureau of Indian Standard (BIS) official said that India is the fourth country after the US, UK and Germany to have its own national standard on bulletproof jacket which provides 360-degree protection.

The BIS is a national body that sets quality standards for various products and services. So far, it has set more than 20,000 standards.

“We brought all stakeholders together and decided on a national standard, which is of international quality. Armed forces are now procuring as per

this standard,” he said.

Elaborating, JK Gupta who is a scientist at BIS and also a member secretary on making national standards for bulletproof jacket, said, “India was not able to procure quality bulletproof jackets in the absence of standards. So, there was a long pending demand from the armed

forces to set quality standards for this product.”

In December 2018, the BIS framed a national standard for bulletproof jacket following a direction from the Prime Minister’s Office and the Niti Aayog, he said.

“The standard on bulletproof jacket was published in December 2018 and now everybody is implementing it. Under the Make in India programme, we have the world class facility and design capabilities. We are exporting these jackets to more than 100 countries even in Europe...,” he said.

Two PSUs MIDHANI and Ordnance Factory at Avadi, Chennai and private firms SMPP (Palwal), Starwire (Faridabad) in Haryana and MKU (Kanpur) in Uttar Pradesh are manufacturing bulletproof jackets as per the BIS norms, Gupta said.

The domestic players have already supplied about 1.86 lakh jackets to defence forces and the tendering process for further supply is underway, he added.

Highlighting salient features of the bulletproof standard, Gupta said tough quality norms are set to ensure jackets can be manufactured in various sizes to suit requirement of soldiers and provide 360-degree protection, including from AK-47 hard steel core bullets approaching at 700 metres per second.

Recently, Niti Aayog member and former DRDO chief V K Saraswat had said more than three lakh bulletproof jackets will be required by Indian armed forces.

According to officials, India so far did not have any specific standard for bulletproof jacket. So far, orders were placed for military and paramilitary forces based on specifications laid out by a customer. ■



DEFEXPO 2020: DEFENCE MINISTER RAJNATH SINGH, UP CM YOGI ADITYANATH REVIEW PREPARATIONS

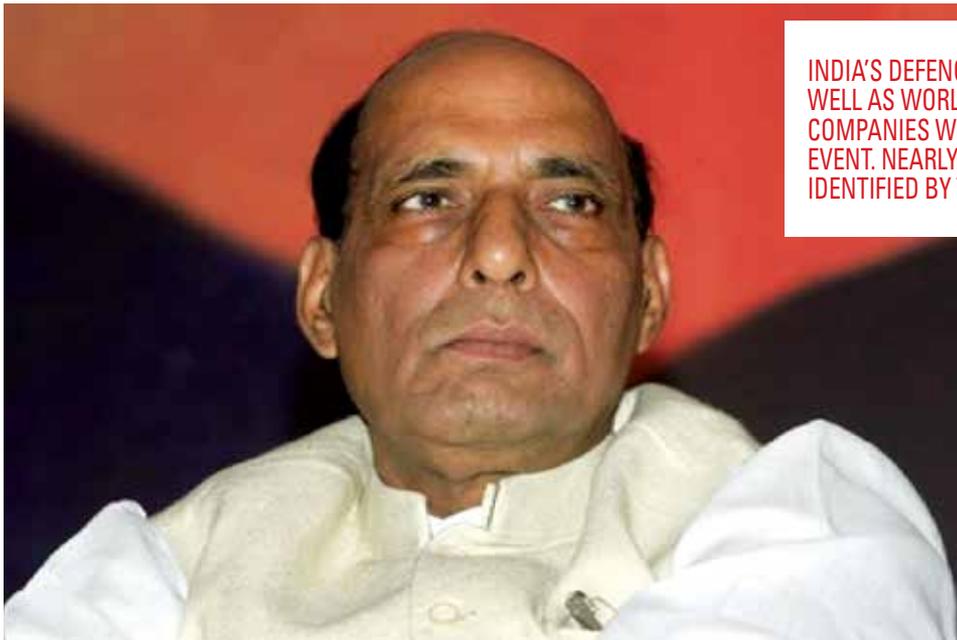
An MoU outlining roles and responsibilities of various stakeholders was signed and exchanged between the officials of Ministry of Defence and Uttar Pradesh Government during Defence Minister's review of DefExpo 2020 preparations

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ew Delhi. Defence Minister Rajnath Singh along with Uttar Pradesh Chief Minister Yogi Adityanath have reviewed the ongoing preparations in the run up to DefExpo 2020, which is scheduled to be held for the first time in state capital Lucknow from February 5-8 next year. Reviewing the planning and arrangements for the event on September 9, the Defence Minister said that the DefExpo would give a great fillip to investments being sought for the defence corridor in Uttar Pradesh. He recalled that during his recent visit to South Korea, several Korean companies have expressed interest to invest in Uttar Pradesh.

and responsibilities of various stakeholders was signed and exchanged between the officials of Ministry of Defence and Uttar Pradesh Government.

Minister of State (MoS) for Defence Shripad Naik, Chief of Army Staff General Bipin Rawat, Chief of Naval Staff Admiral Karambir Singh, Defence Secretary Dr Ajay Kumar,



INDIA'S DEFENCE MANUFACTURING CAPABILITIES AS WELL AS WORLD'S TOP DEFENCE MANUFACTURING COMPANIES WILL BE SHOWCASED DURING THE EVENT. NEARLY 300 ACRES LAND HAS ALREADY BEEN IDENTIFIED BY THE UP GOVERNMENT FOR THE EVENT

India's Defence manufacturing capabilities as well as world's top defence manufacturing companies will be showcased during the event. Nearly 300 acres land has already been identified by the UP Government for the event. The Chief Minister

said a land bank of 3,000 acres is available for companies desirous to invest in Uttar Pradesh and assured them of all necessary cooperation.

DefExpo India 2020 Brochure was also released on the occasion. An MoU outlining roles

Secretary (Defence Production) Subhash Chandra, Secretary (Defence Finance) Gargi Kaul, Secretary, Department of Defence R&D and Chairman, DRDO Dr G Satheesh Reddy and other senior officials of Ministry of Defence (MoD), Chief Secretary of Government of Uttar Pradesh, and Hindustan Aeronautics Limited – the nodal agency of the event attended the meeting.

The 11th edition of DefExpo 2020, the premier Defence Exhibition conducted under the aegis of MoD, will highlight the logo depicting 'India – The Emerging Defence Manufacturing Hub'. The theme for the event is, 'Digital Transformation of Defence'. ■

NEWS ROUND UP

INDIA RUSSIA BEGIN 'NEW ERA' OF COOPERATION

New Delhi. India and Russia have begun a “New Era” of cooperation in the Indo-Pacific region to make it “open, free and inclusive”, Prime Minister Narendra Modi said amid China flexing its military muscles in the strategic region. Addressing the plenary session of the Fifth Eastern Economic Forum in Vladivostok, 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. This will further deepen the Indo-Russia partnership.”

A Memorandum of Intent (MoI) was signed between the two countries for the development of maritime communications between the ports of Chennai and Vladivostok in Russia’s Far East Region. “We are starting a new era of cooperation in the Indo-Pacific region,” Modi said, adding 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”.

The Far East, Modi said will become the bedrock of strong Indo-Russia ties, which is based on the

principles of “rules-based order, sovereignty, respect for territorial integrity and is against engaging in the internal matters of other countries”. India, the US and several other world powers have been talking about the need to ensure a free, open and thriving Indo-Pacific in the backdrop of China’s rising military manoeuvring in the region.

China has been trying to expand its military presence in the Indo-Pacific, a biogeographic region comprising the Indian Ocean and the western and central Pacific Ocean, including the South China Sea. China claims almost all of the South China Sea. Vietnam, the Philippines, Malaysia, Brunei and Taiwan have counter claims over the sea. Modi also met his Japanese counterpart Shinzo Abe on the sidelines of the Eastern Economic Forum. Both the countries agreed to further deepen cooperation in the Indo-Pacific region. It may be noted here that in November last year, India, the US, Australia and Japan gave shape to the long-pending Quadrilateral coalition to develop a new strategy to keep the critical sea routes in the Indo-Pacific free of Chinese influence.



PRAMA HIKVISION INAUGURATES INDIA'S FIRST LARGEST INTEGRATED WORLD-CLASS SECURITY AND SURVEILLANCE FACILITY

New Delhi. Prama Hikvision, India’s market leader in video surveillance products and solutions, on October 1 inaugurated India’s first and the largest world-class manufacturing facility located at Vasai near Mumbai. Dr VK Saraswat, Member, Niti Aayog and former Director General of Defence Research and Development Organisation (DRDO) inaugurated the new facility. With this new facility, which is part of an investment commitment of Rs 500 crores, Prama Hikvision will not only be able to cater to a fast expanding domestic market but also overseas market in a phased manner.

Employing over 2000 skilled and semi-skilled employees, the brown-field facility is spread over 12 acres of land comprising end-to-end production capabilities, which will also support a localisation target of 50 per cent initially and gradually transitioning to 100 per cent localisation in the next 18 months. An ISO 9001:2015 certified facility, the new factory has the capability to manufacture over 850 product models.

Speaking on the occasion, Ashish P Dhakan, MD and CEO, Prama Hikvision India Pvt Ltd, said: “This new integrated state-of-the-art manufacturing facility is an expression of our full commitment to the Government of India’s flagship ‘Make in India’ programme. We remain committed as a long-term partner of the country and continue to pursue our vision of ‘Make in India for a Safer India’ with manifold commitments.”



INDIA, JAPAN COMMITTED TO WORK TOGETHER FOR FREE AND OPEN INDO-PACIFIC

Defence Ministers Rajnath Singh and his Japanese counterpart Takeshi Iwaya welcomed the steady progress in bilateral cooperation in the area of Maritime Domain Awareness (MDA) based on the Implementing Arrangement for Deeper Cooperation between the Japan Maritime Self-Defense Force (JMSDF) and the Indian Navy signed last year

New Delhi. India and Japan on September 2 asserted that the two countries had “unwavering commitment to working together towards a free and open Indo-Pacific.” With the Prime Ministers of India and Japan expressed satisfaction at the progress made in fostering defence cooperation for shared security with the Defence Ministers Rajnath Singh and his Japanese counterpart Takeshi Iwaya reaffirming their desire to further deepen the strategic and defence cooperation between the two nations.

In a joint statement at the conclusion of Singh’s visit to Japan, the two Ministers affirmed their intention to hold the first Foreign and Defence Ministerial Dialogue (2+2) ahead of the Japan-India Annual Summit this year for advancing cooperation towards peace and prosperity of the Indo-Pacific region.

The two leaders welcomed that negotiations on the Acquisition and

Cross-Servicing Agreement (ACSA) have shown progress since the announcement of the commencement of negotiations in the Summit Meeting in October last year.

The Ministers recognised that peace and stability of the Indian and Pacific Oceans are crucial for ensuring prosperity of the Indo-Pacific region and the entire world, and had a frank exchange of views on the current security situation

in the Indo-Pacific region, including developments on the Korean Peninsula and the South China Sea. The two leaders welcomed the steady progress in bilateral cooperation in the area of Maritime Domain Awareness (MDA) based on the Implementing Arrangement for Deeper Cooperation between the Japan Maritime Self-Defense Force (JMSDF) and the Indian Navy signed last year.

Both the Ministers lauded the first bilateral exercise between the JGSDF and the Indian Army in the area of counter-terrorism “Dharma Guardian” was held in the autumn of 2018. Noting that the preparation for the second exercise this year has been steadily progressing, the Ministers welcomed that both sides have produced concrete results for making it a regular exercise.

They welcomed the Japan-India-US trilateral maritime exercise “MALABAR 2019” to be held from late September to early October this year and also the second Japan-India-US trilateral mine-countermeasures exercise (MINEX) held in July this year, and expressed their resolve to continue the trilateral exercise in the same framework from next year onwards. The Ministers recognised the conduct of Japan-India Maritime Exercise (JIMEX) in 2018 and shared the view to conduct the exercise on a regular basis.

The Ministers reaffirmed that strengthening cooperation in the area of defence equipment and technology is essential for further accelerating the cooperation between Japan and India and welcomed that high-level exchanges between the Acquisition, Technology and Logistics Agency (ATLA) and the Department of Defence Production (DDP) have been actively held including the visit of the Secretary of Defence Production to Japan in November 2018 and the visit of the Commissioner of ATLA to India in February 2019. ■



INDIAN ARMY HOLDS SEMINAR ON AI-SAPTA SHAKTI WARTECH 2019

Hisar. With artificial intelligence emerging as an important area which could well change the nature of future military warfare, Indian Army held a first-of-its-kind thematic seminar on the subject at the Hisar Military Station on September 25.

The seminar was attended by domain experts from academia and the industry. Artificial intelligence is an emerging, disruptive technology affecting civil and military domains across the globe, a senior army official said.

“The aim of the event is to bring together professionals, eminent speakers from the defence industry, academia, defence officers to brainstorm the way ahead with the objective to identify and conceptualise AI-based defence applications and platforms for the future battlefield,” he said.

South Western Command chief Lt Gen Alok Singh Kler said, disruptive technologies like artificial intelligence will dictate how the future warfare would happen.

The presence of the academia, which included experts from Indian Institute of Science, Bangalore, at the event gave direction for the efforts to be put into R&D for future weapon platforms, the official said. A few officers from the Air Force and the Navy were slated to attend the seminar.

DEFENCE MINISTER LAUNCHES INDIAN NAVY'S FIRST NEW STEALTH FRIGATE INS NILGIRI



New Delhi. In yet another boost to the country's Naval strength, Defence Minister Rajnath Singh on September 28 launched the first of the seven new stealth frigates INS Nilgiri in what he said was the government's concerted efforts to modernise the Navy and equip it with the best platforms, weapons and sensors to deal with any conventional and unconventional threats to India's maritime interests.

Speaking after the launching ceremony, he said, 70 per cent of India's trade by value and 95 per cent by volume is taking place through the sea route and even a slight disruption of seaborne trade due to piracy, terrorism or conflict, could have serious repercussions on the economic growth and well-being of the nation. The Minister said, India is growing and its commercial interests are spreading far and beyond, yet there are challenges, including a hostile neighbourhood. “State-sponsored terrorism remains a challenge and the strong-willed Government will not hesitate to take tough decisions in the larger interest of the country.

The repealing of the provisions under article 370 of the constitution is one such decision. We are confident that this will usher a new era of development and prosperity in Jammu, Kashmir and Ladakh.”

Saying that “any credible defence of a country is based on the indigenous defence capability”, Singh emphasised on ‘Make in India’ and ‘Design and Make in India’ with regard to defence equipment.

“Out of total 51 ships and submarines on order at various shipyards as on date, 49 are being constructed indigenously. This contributes to our target of building a five trillion dollar economy by 2025 and 70 per cent defence indigenisation by 2027”, he said.

“A vibrant shipbuilding industry can play a major role in the overall economic development of the country”, he said adding that shipbuilding is a labour intensive industry with tremendous potential for employment generation, not only in its own sector, but also in various upstream and downstream industries.

He noted that construction of one frigate itself provides direct employment to 4,800 personnel and indirect employment to around 27,000 personnel for a period of 8 years.

CYIENT, QINETIQ SIGN MOU TO OFFER AVIONICS PRODUCTS FOR UNMANNED TARGET SYSTEMS IN INDIA

Bristol, UK. Cyient, a global provider of engineering, manufacturing, geospatial, network, digital, and operations management solutions, signed a Memorandum of Understanding (MoU) with QinetiQ's Target Systems business to offer avionics products for its unmanned target systems in India.



This agreement allows Cyient to provide advanced manufacturing and electronics engineering solutions to QinetiQ for its unmanned air, land, and sea target systems from India.

"The signing of this MoU with Cyient marks a significant milestone in QinetiQ Target Systems' (QTS) strategy in India. The high levels of expertise and quality within the Cyient business together with the enthusiasm and desire to succeed have impressed us from day one.

Initial efforts are focussed on the manufacture and assembly of avionics and electronics assemblies for our target systems as we grow indigenous activities beyond

the manufacture and assembly of airframes, subsystems and ground equipment already in place," said Graham Brooks, Programme Manager, India at QinetiQ Target Systems.

"We are very excited about the opportunity to collaborate with QTS, a world leader in unmanned air, land and sea targets for live-fire training, test and evaluation exercises. This partnership will allow us to support the Make in

India initiative of Indian Defence by building key subsystems for QTS products. While we will start the collaboration with building avionics products, Cyient's comprehensive design, build, maintain portfolio will be leveraged for other purposes as well.

Cyient can deliver world-class aerospace engineering solutions, award-winning productivity, and innovation framework as required to support QTS products in India. We see seamless alignment of our respective strategies, and the signing of this MoU is a significant milestone in our long-term partnership." noted Rajendra Kumar Patro, Vice President, Aerospace & Defense at Cyient. ■



DEFENCE MINISTER CO-CHAIRS INDO-JAPANESE DEFENCE MINISTERIAL MEETING

New Delhi. Defence Minister Rajnath Singh September 2 co-chaired the Japan – India Defence Ministerial Meeting with Japanese counterpart Takeshi Iwaya in Tokyo and discussed various issues of mutual concern including ways to further strengthen the existing bilateral co-operative arrangements and adopt new initiatives towards achieving peace and security in the region. The Indo-Pacific vision was discussed at length with an expression of India's preference for a rules-based order along with centrality of Association of South East Asian Nations (ASEAN) and inclusiveness and security for all. The importance of the Special Strategic and Global Partnership between India and Japan in addressing regional peace, security and stability was also highlighted. The two Ministers had free and frank discussion on the emerging regional security scenario. Defence Minister also discussed abrogation of Article 370 of the Indian constitution and said talks and cross-border terrorism originating from Pakistan cannot go together. He invited participation of Japanese companies and other stakeholders at biennial DefExpo 2020 to be held in Lucknow. In a tweet Rajnath Singh said, "Had an extremely fruitful Ministerial Level Dialogue with Japan's Defence Minister, Mr Takeshi Iwaya in Tokyo. We discussed the full spectrum of India-Japan defence cooperation. We will continue working together to further deepen the defence ties between both the nations." Singh also called on Japanese Prime Minister Shinzo Abe during which he praised the exceptional relationship between Abe and Prime Minister Narendra Modi. The Minister apprised the Japanese Prime Minister on the contents of the discussion at the Defence Ministerial Dialogue. ■



RAFAEL EXPANDS OPERATIONS IN INDIA, ANNOUNCES NEW FACILITY WITH ASTRA

In line with 'Make in India' – ARC (Astra Rafael Communication System) to produce state-of-the-art tactical communication systems for defence

New Delhi. Astra Rafael Communication System (ARC), a Joint Venture between Astra Microwave Pvt Ltd. and RAFAEL Advanced Defense Systems Ltd. of Israel, inaugurated their state-of-the-art facility at Hyderabad on August 27. The occasion was graced by Minister of State for Home Affairs G Kishan Reddy in presence of Israeli Ambassador to India Mr Ron Malka.

The Joint venture, setup on a 51:49 per cent basis with all regulatory approvals, is in line with the Government's Make in India initiative and will invest in high-end technology and advanced production techniques to design, develop and manufacture state-of-the-art tactical communication

systems (BNET), for the Indian Armed Forces.

The Joint Venture's focus is on leveraging the technological ability and indigenous manufacturing capability of AMPL, combined with the state-of-the-art technology expertise of RAFAEL, to support the requirements of the Indian

Armed Forces in the 'Make in India' programme. It is envisioned that ARC will emerge as a leader at the forefront of technology in the tactical communication domains. This green field Joint Venture envisages creation of significant direct and indirect employment opportunities, import substitution and foreign direct investments into the country.

ARC would soon be India's first private sector company to manufacture cutting-edge Software Defined Radios in multiple variants, at its facility

“OUR COOPERATION WITH INDIA IS STRATEGIC. THIS HAS BEEN DEMONSTRATED A NUMBER OF TIMES, NOT JUST IN DECLARATIONS, BUT IN ACTIONS. THE INAUGURATION OF THE FACILITY HERE TODAY IS YET ANOTHER PROOF OF RAFAEL’S IMPLEMENTATION OF INDIA’S PRIME MINISTER’S MAKE IN INDIA STRATEGY AND POLICY”

spread across an area of over 20,000 sq ft. ARC will also be involved in the development and manufacture of a wide range of other advanced capabilities with the aim of opening new export markets. RAFAEL’s President and CEO, Maj. Gen (Ret.) Yoav Har-Even: “Our cooperation with India is strategic. This has been demonstrated a number of times, not just in declarations, but in actions. The inauguration of the facility here today is yet another proof of RAFAEL’s implementation of India’s Prime Minister’s Make in India strategy and policy and of our ongoing and uncompromising support for the needs and requirements of the Indian Armed Forces.”

COO ARC, Brig Ravi Hariharan: “ARC is a company which is starting into the business of revolutionising the communication domain in the defence environment. Currently we have ongoing orders for providing state of the art Software Defined Radios to the Indian Air Force. We intend to work with all the players in this strategic sphere, both public and private sector to create a great environment for defence electronics. ARC would like to acknowledge the contributions made by both Astra Microwave and Rafael in helping this company come alive and allow us to contribute to the country’s much-needed indigenous defence capability.” ■

SECURITY SOLUTIONS PROVIDER SMITHS DETECTION OPENS STATE-OF-THE-ART SERVICE CENTRE IN INDIA



Gurugram. Border security solutions provider and a defence company Smiths Detection has announced the opening of its state-of-the-art Service, Training and Experience Centre in Gurugram, India. With an investment of 1.5 million US dollar, the facility is a first of its kind in the region and features a training centre, a rework depot, a customer call centre, a parts warehouse and a customer experience laboratory. The 11,000 square feet facility will boost Smiths Detection’s support to its customers across airports, ports and borders, hospitality industries, critical infrastructure, logistics providers and e-commerce platforms in countries throughout Asia Pacific and the West Asia. “Smiths Detection’s continued investments in the region reflect our commitment to the Asia Pacific and the West Asia,” said Jerome de Chassey, Vice President for Smiths Detection Asia Pacific & West Asia.

“The new Service, Training and Experience Centre in India will allow us to work with customers to implement future-proof threat detection strategies and provide training to use our technology most effectively.”

“India is expected to become the world’s third largest air passenger market by 2024. Keeping in pace with the changing landscape, we want to be able to offer our customers enhanced support and training services that they need,” said Vikrant Trilokekar, Smiths Detection’s Managing Director for India.

“Our new Service, Training and Experience Centre will better enable our team to quickly respond and help our customers find solutions that best address their growing business needs.”

Smiths Detection is a global leader in threat detection and screening technologies for aviation, ports and borders, urban security and defence. With more than 40 years of field-tested experience, Smiths delivers the solutions needed to protect society from the threat and illegal passage of explosives, prohibited weapons, contraband, toxic chemicals and narcotics. ■

SWEDISH MAJOR SAAB PLANS MEETING INDIAN COMPANIES TO DEVELOP DEFENCE MANUFACTURING ECOSYSTEM

Saab is among the contenders for supplying around 110 fighter planes to India under the Multi Role Fighter Aircraft (MRFA) programme

New Delhi. With the opening up of defence manufacturing in India, Swedish defence major Saab is planning to hold meetings with Indian companies next month to develop ecosystem in the country for manufacturing multi-role fighter aircraft, a top official of the company said September 12.



Saab is among the contenders for supplying around 110 fighter planes to India under the Multi Role Fighter Aircraft (MRFA) programme. The Indian Air Force in April 2018 issued an initial tender or Request for Information (RFI) for the billion dollar procurement deal. Saab responded to the initial tender in July 2018 with its Gripen-E MRFA.

Mats Palmberg, VP Industrial Partnerships and Head of Gripen India Campaign said the company has undertaken surveys for aerostructures parts, such as sub-assemblies, machined parts and sheet metal parts. "The industry

evaluation tour will take place for 10 days in mid-October. A dozen Indian SMEs suitable for systems manufacturing will be met...by a team consisting of different Saab companies, international system suppliers headed by members of the Gripen for India team," Palmberg said.

Palmberg said Saab has been holding continuous discussions with the company's international partners and suppliers and with the Indian companies. The company has Saab India Tech Centre (SITC) in Hyderabad, which together with Tech Mahindra is undertaking Gripen development work. ■

INDIA NEEDS MORE R & D AND INNOVATION, SAYS DEFENCE MINISTER



New Delhi. There is need for India to focus more on Research and Development, innovation and creation of cutting-edge technologies to become self-reliant in defence production, said Defence Minister Rajnath Singh. Inaugurating the seventh edition of Engineers Conclave in Bengaluru on September 19, he said this year's conclave is based on two themes, 'Defence Technology & Innovation' and 'Transformation of Rural India Using Digital Technologies'.

Singh said the Indian defence industry had not performed to its full potential in the past that led to the country's overwhelming dependence on imported arms. He emphasised that developing critical and cutting-edge technologies indigenously will make the country self-sufficient, saving the precious foreign exchange, which could be utilised in other development activities in the country. He described continuous innovation as the key to success for any nation, given the fast pace at which technology becomes obsolete every passing day. "It is well said that when nations go to war, the one with the best technology is most likely to win," he said.

Stressing on the need for Artificial Intelligence (AI) in Defence, the Minister said AI is capable of bringing significant transformations in the way future military operations would be conducted. He said the Government has already prepared a roadmap for making India a significant power of AI application in Defence. He emphasised on technology and innovation in the defence sector as it has enormous spin-off benefits for the masses as well. Reiterating the Government's resolve to make India a US\$ five trillion economy by 2024 and subsequently US\$ 10 trillion by 2030, the Minister said defence is the major sector which has to contribute significantly towards realisation of this level of growth. ■

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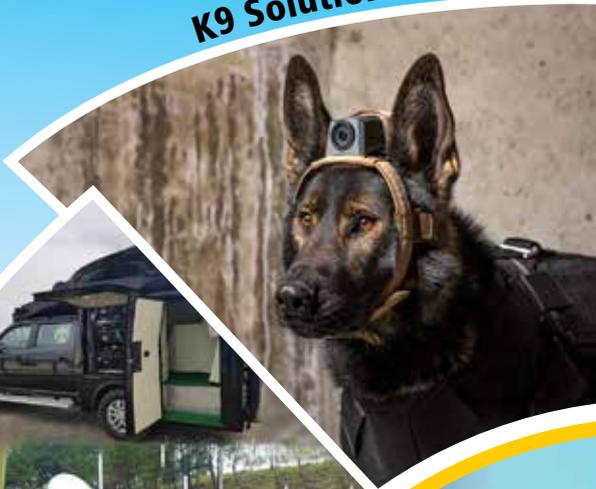
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