

# DEFENCE AND SECURITY ALERT

SAARC COUNTRIES : US\$ 20  
REST OF THE WORLD : US\$ 25

February 2015

INDIA : ₹ 120

VOLUME 6 ISSUE 6

The First and The Only ISO 9001:2008 Certified Defence and Security Magazine in India

# DSA™

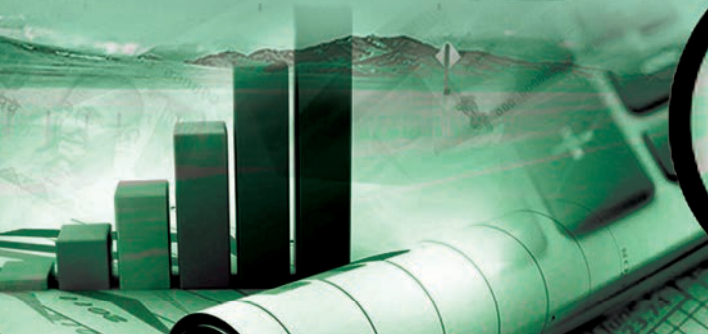
THE ONLY INDIAN DEFENCE AND SECURITY MAGAZINE  
AVAILABLE ON INDIAN AIR FORCE (IAF) INTRANET



## AERO INDIA 2015



**PRE-BUDGET  
MUSINGS**  
BUDGETING-CHALLENGES  
TO BOLSTER DEFENCE  
AND SECURITY



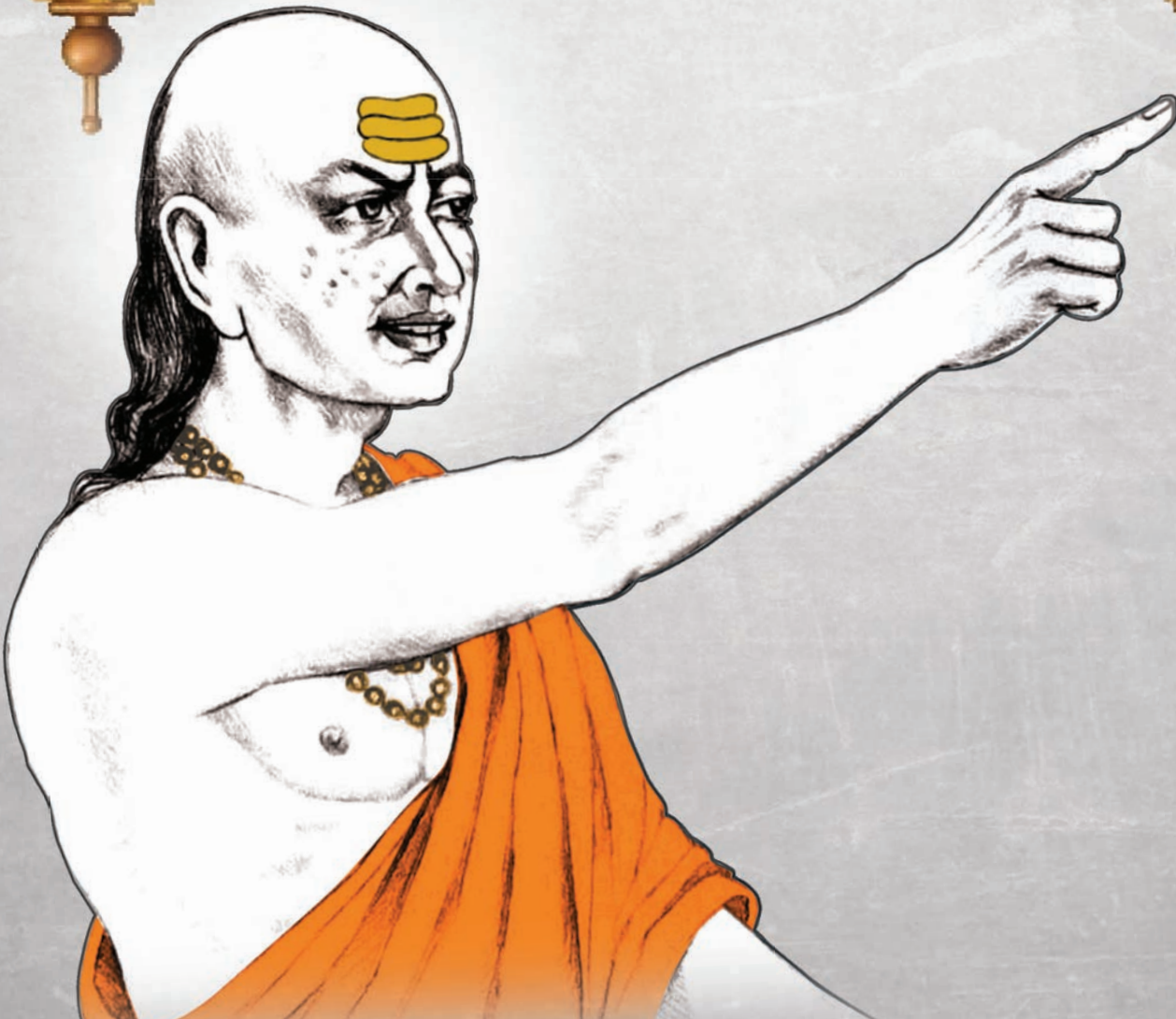


**DSA™**

## **MISSION**

*The power of a King lies in his mighty arms ...  
Security of the citizens at peacetime is very important  
because State is the only saviour of the men and women  
who get affected only because of the negligence of the State.*

**— Chanakya**





# DSA is as much yours, as it is ours!

Entering its second decade of being India's premier technology showpiece, Aero India has also emerged as the largest show of its kind in Asia. Not that India is the largest aviation market, or aero technology provider, or even an aircraft production giant. None of these apply to India, as yet anyway. Despite all these factors missing, India has succeeded in pushing Aero India to the top of the blocks of aviation shows. The numbers are not staggering as yet, but they're nevertheless impressive. At the last edition of the biennial event more than 100,000 people attended. Good figure for a specialised technology intensive event. But not enough given the scale of India's potential and emerging manpower talents.

It is for the emerging India that Aero India holds great promise and hope. Showcasing the best in the world and the best India has to offer, in the aviation technology sector, the aim is to attract greater talent into this field. Only when more bright young technologists enter this sector will India and its aviation industry pick up pace. At the moment it is not much to talk about. Everyone knows there is potential and everyone also knows there is a huge requirement. But between the potential, the requirement and the delivery, there is a mismatch. And this mismatch has to be overcome to enable India achieve its military-technical potential.

Since 1996 Aero India has been the benchmark for aviation enthusiasts and professionals, in the country and outside. So much so that it has grown into being the biggest of its kind in the continent. That is an admirable feat. The Defence Exhibition Organisation under the Ministry of Defence puts it together. There is of course ample help from Defence Research and Development Organisation, Ministry of Civil Aviation and other government departments and agencies. They all combine talent and resources to put together the most impressive aviation show in Asia. It is important that the same coming together of talent be emulated and repeated in the field of military and civil aviation industry in India.

The recently concluded visit of US President Barack Obama has generated much hope for the bettering of relations, particularly in the field of defence cooperation. The decade old Defence Framework Agreement has been further extended and some 'pathfinder' technologies are to be jointly developed. Amongst them are the *Raven* mini-UAVs, vital for the immediate tactical battle space. The next generation *Raven* will provide small team, or even larger unit level, operations with an eye in the sky capability. This will greatly expedite decision-making, thus helping the conduct of combat. In the same vein there is the development of roll on roll off kits for *C-130 Hercules*, an aircraft that India is already flying in a specialised version. These kits will greatly enhance the capability of the *C-130*. Then there is reportedly an agreement for aircraft carrier technology that helps in the development of technical landing systems for planes.

All of these are aviation related agreements and it is great coincidence that they were signed on the eve of Aero India 2015. After all their end result is to enhance India's aviation capabilities in combat or combat support. But that can only truly happen when the Indian domestic sector picks up the responsibility and truly develops its technical skills. These begin with research, design, development, production, testing and finally full scale manufacturing. For all of this to happen there has to be a partnership between the state and the private sector.

There are enough examples around the world for this model. Once India's largest supplier, Russia, has a model and now the largest supplier, the United States, has its own model. India has to be open to selecting a model that suits it best, in terms of what is feasible and what is required. And on that basis proceed ahead. Hopefully the Indo-US agreement will spur the domestic to do its bit and in the near future Aero India will see greater variety and levels, of Indian aviation products.

**Manvendra Singh**



**Chairman** Shyam Sunder  
**Publisher and CEO** Pawan Agrawal  
**President** Urvashi J Agrawal  
**Director** Shishir Bhushan

**Editor-in-chief** Manvendra Singh  
**Executive editor** Nitin A Gokhale  
**Corporate consultant** KJ Singh

**Corporate communications**  
 Mamta Jain

**Administration**  
 Jyoti Chopra

**Creative**  
 Pal Singh

**Representative (USA)**  
 Steve Melito  
**Representative (J&K)**  
 Salil Sharma

**Correspondent (Europe)**  
 Dominika Cosic

**Production**  
 Dilshad and Dabeer

**Webmaster**  
 Sundar Rawat

**IT operations**  
 Mehar Dogra  
 Mahendra Singh  
 Ankit Kumar

**Photographer**  
 Subhash

**Circulation and distribution**  
 Anup Kumar

**E-mail: (first name)@dsalert.org**  
 info: info@dsalert.org  
 articles: articles@dsalert.org  
 subscription: subscription@dsalert.org  
 online edition: online@dsalert.org  
 advertisement: advt@dsalert.org

**Editorial and corporate office**  
 Prabhat Prakashan Tower  
 4/19 Asaf Ali Road  
 New Delhi-110002 (India)  
 t: +91-011-23243999, 23287999, 9958382999  
 e: info@dsalert.org  
 www.dsalert.org

**Disclaimer**  
 All rights reserved. Reproduction and translation in any language in whole or in part by any means without permission from Defence and Security Alert is prohibited. Opinions expressed are those of the individual writers and do not necessarily reflect those of the publisher and / or editors. All disputes are subject to jurisdiction of Delhi Courts.

Defence and Security Alert is printed, published and owned by Pawan Agrawal and printed at Graphic World, 1686, Kucha Dakhini Rai, Darya Ganj, New Delhi-110002 and published at 4/19 Asaf Ali Road, New Delhi (India). Editor: Manvendra Singh



## Propitious Resurgence

**T**he reaction of our neighbours China and Pakistan to US President Barack Obama's visit to India underscores the dangers posed by these two to India and the Asia-Pacific region. The collusion between Beijing, Islamabad and Pongyang in the horizontal proliferation of nuclear weapons and the means of delivery has created a bulwark from behind which Pakistan-trained terrorists have tried to sap the strengths of both India and the US. It reveals that

the kernel of the China-Pak geostrategic relationship is based largely on the use of terrorist 'non-state actors'. In its 'all-weather' support to Pakistan, China is also bolstering to the hilt the use of Islamic fundamentalist jihadi terrorists as tools of state policy.

This conjunction of the nuclear, conventional and sub-conventional methods of warfare has stoked fears in the region that they will provoke a two-front war against India to satisfy a craving for an overland connection between China's Pacific Ocean seaboard and the Arabian Sea over illegally held territory that belonged to the former princely state of Jammu and Kashmir acceded to India. It also highlights the new hegemonic aspirations in the Indian Ocean region. It is in this context that this year's biannual Aero India exposition acquires special significance for creation of the wherewithal within India for an aerospace defence capable of sustaining two-front war on the India-Pakistan and India-China frontiers and Pak / China-inspired machinations in the hinterland.

The new BJP-led government has sought to clear the logjam in the acquisition of new generations of fighter-bombers to replace the ageing and obsolescent MiG family of Russia-built aircraft that helped defend India successfully in the 1965 and 1971 Wars with Pakistan. It is now time to look two decades ahead at what should be India's posture in the aerospace domain. That is what the **DSA** in this issue has sought to do. The Republic Day parade highlighted the current capabilities, including the air display by US supplied medium-lift C-130J Super Hercules, the heavy-lift C-17 Globemaster and P8I maritime reconnaissance and strike aircraft and the Russian Sukhoi deep penetration strike aircraft all of which have a very specific China orientation and can handle Pakistan collaterally.

The accent of air power in the coming decades will be on acquisition of fifth generation-plus fighter-bombers and the ability to reach into the Chinese heartland if necessary. This entails the upgradation of not only the air power infrastructure of the Air Force, Army and Navy but also the flexible deployment facilities for the Paramilitary forces like the Border Security Force, the Central Reserve Police Force and Indo-Tibetan Border Police. So in a way the upcoming **Aero India 2015** will create more value addition to the procurement process in lieu of the announcement of 49 per cent FDI in Defence by the current government and all the major manufacturers of the aero products and technologies around the world will be participating.

This edition is dedicated to the **Aero India 2015** show and you will find many, research-based articles by the experts on all aspects of air power which make this edition a very special one. **DSA** has the privilege of publishing an interview with the Deputy Chief of Air Staff Air Marshal SBP Sinha in this edition. Under a new **DSA** feature titled 'Know The Chief' we present a complete profile of our Chief of the Air Staff Air Chief Marshal Arup Raha, his great career graph and his achievements.

This edition also carries **Pre-budget Musings** by renowned subject experts. With the announcement of defence budget round the corner, this is an integral aspect that needs meticulous scrutiny of its strengths and weaknesses. It is an exercise in explaining the crux of national security planning and the means and sapience of achieving the required Defence capabilities. I am sure that these articles will open new ways and provide insights to develop a robust defence budget of India considering the shortfalls and the challenges that our Defence forces are facing.

Jai Hind!

**Pawan Agrawal**

## Announces MARCH 2015 Issue on



## WOMEN IN DEFENCE AND SECURITY

For subscription write to: [subscription@dsalert.org](mailto:subscription@dsalert.org) ■ [online@dsalert.org](mailto:online@dsalert.org)

Or call: +91-11-23243999, 23287999, 9958382999



# SPECIAL ISSUE FEBRUARY 2015

# Contents

**FEATURES**

**ARTICLES**

<b>Defence R&amp;D</b> Sharad M Marathe	10
<b>The Indian Air Force Aerospace Technologies And The Years Ahead</b> Air Chief Marshal Fali Homi Major (Retd)	12
<b>Indigenisation Of Aviation</b> Air Marshal Anil Chopra (Retd)	15
<b>Winning The War Without Weapons Electronic And Cyber Warfare</b> Air Marshal BN Gokhale (Retd)	18
<b>The Unpolished Diamond In Defence Manufacturing</b> AVM Manmohan Bahadur (Retd)	22
<b>Indian Air Force In The 21st Century</b> Air Marshal Dhiraj Kukreja (Retd)	26
<b>Grand Plans Need Proper Implementation</b> Nitin A Gokhale	30
<b>Jointmanship In Acquisition</b> Vice Admiral Shekhar Sinha (Retd)	32
<b>Wings Over Waves</b> Vice Admiral Barry Bharathan (Retd)	34
<b>Evolution Of Air Wing Its Role, Challenges And Support To BSF</b> Team DSA	38
<b>Aviation Security A Complex Challenge</b> Cmdt Sudhir Kumar	44
<b>PLAAF Emphasis On Man Behind The Machine</b> Arjun Subramanian P	48
<b>New FDI Policy For Defence Industry And Its Impact On Defence Procurement</b> Nidhi Goyal	50



<b>Ruminations On Defence Budget 2015-16</b> Amit Cowshish	54
<b>Reforming Defence Budgeting Regime</b> Maj Gen Dr Mrinal Suman (Retd)	56
<b>Defence Self-reliance Torpedoed By Procurement Procedure</b> Col KV Kuber (Retd)	59
<b>Indigenous Defence Manufacturing In India</b> Subimal Bhattacharjee	63
<b>Bottlenecks In Defence Acquisitions</b> Col Sanjeev Dalal (Retd)	65
<b>Defence Budget: Current And Next</b> Team DSA	68



<b>Sneak Peek</b>	3
-------------------	---



<b>Exclusive Interview Deputy Chief Of The Air Staff Air Marshal SBP Sinha</b>	6
<b>Know The Chief Indian Air Force</b>	9
<b>Boeing C-17 and P-8I Always Mission Ready For India</b> Dennis D Swanson Vice President, India Boeing Defense, Space & Security	41
<b>Industry Monitor</b>	42
<b>Leveraging Partnerships and Offsets To Boost the Indian Aerospace Sector</b> Ankur Kanaglekar International Strategic Partnerships Boeing Defense, Space & Security	53
<b>Get Connected</b>	71



# EXCLUSIVE INTERVIEW

## WITH DEPUTY CHIEF OF THE AIR STAFF AIR MARSHAL SBP SINHA AVSM, VM

**A**ir Marshal SBP Sinha AVSM, VM was commissioned in the fighter stream of the Indian Air Force (IAF) on June 15, 1980. He has over 3,700 hours of flying experience and has flown the Hunter, MiG-21, Mirage 2000 and Su-30MKI fighter aircraft. Air Marshal Sinha has held various important Command, Instructional and Staff appointments which include Instructor at the Flying Instructors' school, Chief Flying Instructor of Basic Flying Training School, Air Force Examiner in the Aircrew Examining Board, Commanding Officer of a MiG-21 squadron, Commandant of Electronic Warfare Range, Air Officer Commanding of a premier Su-30MKI base and Team Leader of the AWACS Project Team in Israel. He has also held important Staff Appointments at the Air Headquarters which include, Deputy Director of Operations (Electronic Warfare), Principal Director of Plans, CISR and Acquisitions and, Assistant Chief of Air Staff (Plans) at Air HQ. Here in an exclusive interview with DSA he expounds his views on the modernisation plans of the Indian Air Force.

**Defence and Security Alert:** What is the long-term perspective plan for the Indian Air Force?

**Deputy Chief Of The Air Staff:** The modernisation of the IAF is progressed as per the capability building road map laid out in the Long Term Integrated Perspective Plan (LTIPP) which is spread over a period of 15 years. LTIPP 2012-27 was approved by the Defence Acquisition Council on 02 April 2012 and all Capital procurements are being planned in accordance with this plan. The focus over the coming years would be to undertake continuous upgradation of the Combat potential of our fleets both in terms of numbers and lethality. The IAF plans to induct additional Su-30 MKI, Medium Multi Role Combat Aircraft, Light Combat Aircraft, Very Heavy Transport Aircraft, Replacement for Avro aircraft, Flight Refuelling Aircraft, Airborne Warning and Control Systems, Airborne Early Warning And Control System, Attack Helicopters, Heavy Lift Helicopters, Medium Lift Helicopters, Advanced Light Helicopters, Recce and Surveillance Helicopters, Light Utility Helicopters and Basic Trainer aircraft. Emphasis will also be given to the upgradation of the Air Defence system by induction of modern sensors and weapons as well as networking them. Modernisation of the Operational and Technical Infrastructure is also being undertaken to provide the desired combat support.

**DSA:** How does Indian Air Force plan for the future and overcome obsolescent equipment?

**DCAS:** The IAF inventory is a mix of old and new equipment. Ageing of systems is a natural process and is dealt with through proper maintenance, obsolescence management and mid-life upgrades where required. MiG-21 and MiG-27 fleets have already been upgraded. MiG-29, Jaguar, Mirage-2000, An-32 and Mi-17/Mi-17-1V are being upgraded in a phased manner. The aim is to enhance the operational relevance of the older fleets while continuing to induct newer state-of-the-art platforms.

**DSA:** What are the major procurement plans that the Indian Air Force has for the next 4-5 years?

**DCAS:** The planned inductions over the next five years include additional Su-30 MKI, Medium Multi Role Combat Aircraft, Light Combat Aircraft, Very Heavy Transport Aircraft, replacement for Avro Aircraft, Special Operations Aircraft, Attack Helicopters, Heavy Lift Helicopters and Medium Lift Helicopters along with Basic Trainer Aircraft. The IAF is also in the process of procuring new generation Air-to-Air, Surface-to-Air and Air-to-Ground weapon systems as well as state-of-the-art Electronic Warfare Systems. All airfields of IAF are being upgraded in a phased manner with modern navigation and landing aids. IAF is also progressing towards Network Centric Operations.

**DSA:** The MMRCA process has been one of the most significant achievements of Indian Air Force. Could you elaborate on how it was done and what criterion was adopted? Should it be patented?

**DCAS:** MMRCA procurement process was initiated by IAF in September 2000. It was decided to procure 126 aircraft through global multi-vendor tendering process under 'Buy and Make' category with 'Transfer of Technology (ToT)' and 50 per cent offsets. Under this procurement, 18 direct flyaway aircraft will be procured from OEM and 108 aircraft would be license manufactured in India through ToT with HAL as Lead Production Agency in three phases ie from Semi Knocked Down, Completely Knocked Down and Indigenously Manufactured Kits. The MMRCA RFP was so framed as to encourage private participation in the field of military aviation and gradually acquire knowledge and therein the capability to help the country achieve self-sufficiency in the field of military aviation in the long run. The RFP nominated HAL as the Lead Production Agency for the License manufacture and the vendor was permitted to select his Indian Production Agencies (IPAs) from Public and private sectors; The RFP was issued to all



Air Marshal SBP Sinha

aircraft manufacturers in the world and included 660 Air Staff Qualitative Requirements (ASQRs), which were formulated based upon IAF requirements of a modern medium multi role combat aircraft. The ToT to India sought through the MMRCA programme is substantially higher than the ToT in any earlier acquisition, as it encompasses phase wise manufacture, extensive Maintenance ToT and most importantly an Indigenous Unilateral Upgrade Capability, which has never been sought earlier. This capability will enable unilateral integration of new weapons and avionics in future without the need to involve the OEM. The MMRCA RFP was the first RFP issued by GoI to include a Total Cost of Acquisition (TCA) model for selection of the L-1 vendor so that the nation gets the best value for money in the long run. After exhaustive technical and field evaluations of the six aircraft viz F-16 and F/A-18 of US,

Eurofighter Typhoon of Germany, Rafale of France, MiG-35 of Russia and Gripen of Sweden spanning over two years, Eurofighter of EADS and Rafale of Dassault Aviation were found to be compliant to all conditions of the RFP. The MMRCA evaluation was carried out in the most professional and transparent manner in accordance with DPP-2006 and was praised by the global media and even by the vendors who did not qualify in the field evaluation trials. The commercial proposals of EADS and Dassault Aviation were evaluated and Dassault Aviation emerged as the L-1 vendor based upon Total Cost of Acquisition (TCA). Dassault Aviation will provide ToT for license manufacture and maintenance of Rafale to HAL and other IPAs. The MMRCA procurement is being undertaken in accordance with DPP-2006 and the TCA methodology is an internationally accepted procedure.



**DSA:** When is the final decision on MMRCAs expected?

**DCAS:** The contract negotiations with the L-1 vendor commenced in February 2012. As of now, three CNC Sub-Committees negotiating the 'Maintenance', 'Offset' and 'Transfer of Technology' have completed their negotiations and submitted their report to the CNC. The 'Contract' Sub-Committee has completed most of the contractual aspects with the representatives of the vendor and HAL. IAF hopes that the pending issues will be resolved soon and a contract will be signed after obtaining the CCS approval.

**DSA:** How are you strengthening the helicopter fleet of Indian Air Force? What role would Chinook and Apache play in future?

**DCAS:** IAF intends to enhance its heli-lift capability over a period of time. This includes procurement of Attack and Heavy Lift Helicopters, Medium Lift Helicopters to replace the ageing Mi-8 fleet and upgrade of the existing fleet of Mi-17 / Mi-17-IV helicopters. The process is also on to identify a suitable replacement for the Chetak / Cheetah helicopter fleet through the 'Buy and Make (India)' route. The Heavy Lift Helicopters (Chinook) would be utilised to conduct strategic and tactical airlift missions in support of the armed forces and also help civil authorities during calamities through Humanitarian Assistance and Disaster Relief missions. The Attack Helicopters (Apache) will be employed in Suppression of Enemy Air Defence operations, Counter Surface Force Operations, Unmanned Aerial Vehicle neutralisation operations, Combat Search and Rescue operations and precision strikes against small sub-conventional threats and Urban Warfare.

**DSA:** Is the Indian Air Force transport fleet affected because of lack of replacement for Avro? What is the way forward?

**DCAS:** The IAF urgently needs a transport aircraft to replace the Avro aircraft, having austere take-off and landing capabilities and the capability to undertake loading / offloading of equipment as well as deployment of paratroopers from a rear ramp. These attributes are essential since a large number of airfields in India can be operationally exploited only by this class of aircraft. The Avro aircraft were inducted in the IAF in the 1960s and have now reached obsolescence. The case for procurement of an aircraft to replace the Avro was conceived in 2011 and all efforts are being made to finalise the procurement at the earliest. In the absence of a replacement, in order to retain the operational capability, the Avro fleet is being maintained and sustained on 'Reduce to Produce' basis and as such the number of Avro aircraft available is continuously reducing.

**DSA:** How is the Indian Air Force placed as far as Air Defence is concerned? What new inductions are planned?

**DCAS:** Many of the SAGW systems being operated by

the IAF are old. The Air Defence units of IAF are in the process of a major transformation and we are making all efforts to enhance their effectiveness and capability. We have put a comprehensive plan in place to make the Air Defence system more robust with the planned induction of Medium and Short Range Surface-to-Air Missiles, Close-in Weapon Systems and integrating these weapons with modern sensors and our AD network. The indigenous Akash missile system has already been inducted and several radars designed and produced indigenously are augmenting the air defence surveillance capability of the IAF.

**DSA:** What is the Indian Air Force view on the 'Make in India' campaign? Are Indian industries capable of meeting the requirements of our Armed Forces?

**DCAS:** The Indian aerospace industry is at a nascent stage with HAL being the only player with very little participation from the private sector. For a country of our size and our growing aviation requirements, we need to have a larger number of big and small industries in the aviation sector for a robust defence industrial ecosystem. As far as the IAF is concerned, we are pursuing a proposal to procure 56 transport aircraft for the IAF as 'Buy and Make', where the OEM will choose an Indian Production Agency from the private sector. Additionally, Requests For Information (RFIs) for the procurement of Air-to-ground weapons, Air-to-Air weapons, Surface-to-Air Guided Weapons, Electronic Warfare Systems and Radars have been issued to CII, ASSOCHAM and FICCI so that they can identify Indian companies which are capable of and interested in manufacturing these systems indigenously. We are encouraged by the interest shown by the Private sector to participate in the process and some of the projects where they are keen to participate are LCA Mk-II, AMCA and Short and Medium range surface-to-air missile. The IAF plans to involve the Private sector in the projects from the Design & Development stage, all the way up to the production stage. Progress and enhanced capability can only be achieved when all areas of the industry, Public as well as Private, work together to complement each other. The IAF will be very happy to operate state-of-the-art weapons and systems which bear the 'Made in India' mark and would in fact be extremely proud of employing them.

**DSA:** Indian Air Force has long been unhappy with the quality assurance from Hindustan Aeronautics Limited (HAL). What are the challenges and compulsions in dealing with HAL and what is the way forward?

**DCAS:** HAL is the sole aviation industry in India and as such most IAF projects are linked to HAL. While HAL has grown over the years and inducted new production technologies, there are issues regarding serviceability, spares support, quality control as well as quality assurance and of course, time and cost overruns with many HAL projects. Efforts are on to address the issues through structured and more frequent interactions between MoD, IAF and HAL. **DSA**

## Air Chief Marshal Arup Raha PVSM, AVSM, VM, ADC Chief Of The Air Staff



**A**ir Chief Marshal Arup Raha PVSM, AVSM, VM, ADC graduated from the National Defence Academy, Pune with the President's Gold Medal in 1973 and was commissioned in the Flying Branch in December 1974.

Air Chief Marshal Raha is an experienced fighter pilot. He is a Cat A Qualified Flying Instructor and a Fighter Combat Leader with nearly 3,400 hours of flying experience, mainly on fighter aircraft. He has served as a Directing Staff at two premier institutes of IAF, Flying Instructors School and the Tactics and Combat Development Establishment. He has functioned as an inspector in the Directorate of Air Staff Inspection in Air Headquarters and as Staff Officer to the Chief of the Air Staff. He was deputed as the Military and Air Attache in the Embassy of India, Kyiv, Ukraine from 1999 to 2001. He has held many operational assignments such as Commanding Officer of a MiG-29 Squadron, Station Commander of Air Force Station Bhatinda in Punjab during 'OP PARAKRAM', Air Officer Commanding Air Force Station Adampur and Advance Headquarters Western Air Command, Chandimandir. He has also served as the Deputy Commandant Air Force Academy, Hyderabad and Senior Air Staff Officer at Headquarters Western Air Command. He has the rare distinction of being the Air Officer Commanding in Chief of two Operational Commands ie Central Air Command and the Western Air Command. Before taking over as Chief of the Air Staff, he held the appointment of Vice Chief of the Air Staff. He is currently the Commodore Commandant of No 47 Squadron.

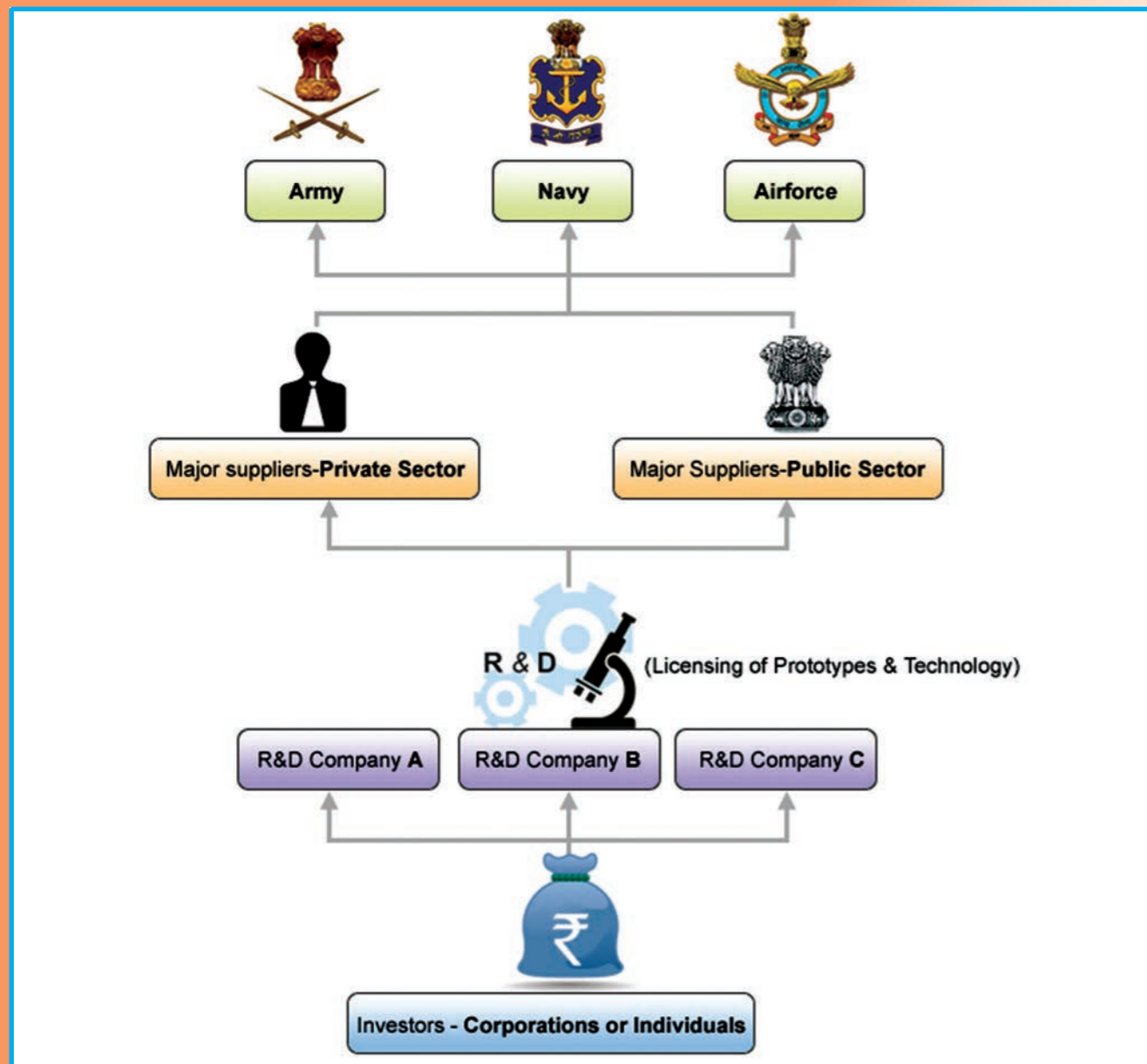
Air Chief Marshal Raha is an alumnus of Defence Services Staff College and the National Defence College, Delhi. For his distinguished service, he has been awarded Param Vishisht Seva Medal, Ati Vishisht Seva Medal and Vayu Sena Medal. He was appointed as Honorary Aide De Camp (Air) to the Hon'ble President of India wef 01 December 2012. **DSA**





# DEFENCE R&D

In the upcoming national budget I would like to urge the Finance Minister to consider incorporating the proposed changes in the Income Tax Code as outlined below. The key drivers to the India based development of new technology are: Innovation, Technology, Capital formation, management skills and execution.



Prime Minister Narendra Modi has given a call to action through his 'Make in India' campaign. The time is right to take concrete and bold steps that will accelerate the implementation of this initiative. I am presenting here a new approach to encouraging and accelerating the development of technology in India.

One of the major industries that can show significant and rapid results in the 'Make in India' campaign is Defence. The need is large and the results can be very impressive.

In the upcoming national budget I would like to urge the Finance Minister to consider incorporating the proposed changes in the

Income Tax Code as outlined below. The key drivers to the India based development of new technology are: Innovation, Technology, Capital formation, management skills and execution. Out of these the technology developers can manage everything else except the capital. And that is where the proposed tax credit can play a huge and immediate role. Benefits to the government will be as follows:

- Minimising dependence on imported technology in crucial sectors such as Defence.
- Reduction in the cost of the Defence equipment produced using such technologies.
- Rapid development of new Defence and other security related products.

Once the government provides the new tax incentives floodgates will open regarding the setting up of new R&D units in India. Such units may be set up by India based entrepreneurs, many NRIs as well as others interested in tapping into this major opportunity.

All over the world large companies are good at developing complex products that consist of a collection of smaller sub-systems – components, sub-assemblies. But such sub-systems are frequently developed and supplied by smaller companies. This way each does what they are good at. India too can do the same.

### The New Proposal

In the proposed revival of section 80-IB (8A) Income Tax Act the following additional provisions should be included. This will make it more attractive for the companies to raise capital required for undertaking new technology and product development. The benefits will be realised in the Defence as well as non-Defence sectors of the economy. It will result in rapid growth of R&D companies and thus the technology they develop. In doing so, India will accomplish both Speed and Scale.

The technology developed by the R&D companies can in turn be licensed to larger manufacturing companies which can manufacture and supply the products. These companies will typically be start-ups or those already in business and have the capability to advance technologies but are short of the required capital. Shortage of equity capital is a major constraint felt by R&D companies and this proposal will creatively address that problem.

The innovators may be Scientists or Technocrats with brilliant ideas but lack the capital to develop their ideas and technologies into usable products. To overcome this, it is proposed that investors who contribute to the equity of the companies be given incentives for such investment in the form of tax credits. The key points of this proposal are as follows:

- Investors in the R&D companies should be able to reduce their taxes payable to the extent of their investment into the equity of the companies.
- The tax credits could be availed in three equal instalments during three successive tax periods.
- The total equity held by all investors taken

together and qualifying for such tax credits should not be greater than 49 per cent of the equity of the company.

- Investors would not be allowed to sell their equity stake for 5 years from the date of their investment.
- The R&D companies must be registered with the DSIR or a registration authority within the Ministry of Defence.
- Founder directors be allowed sweat equity such that he or his (or her) team of shareholders cannot be evicted from the company's Board.
- Investors or their nominees cannot have a majority of the seats on the company's Board.
- The R&D company will work with end customers in type approvals from the agencies and the technologies can be licensed to larger companies with manufacturing and management capabilities.

In addition to Defence this model can also be beneficial to other industries which are engaged in supplying to infrastructure industries such as power, construction, railways and others. The benefit arising out of this may be products which are import substitutions and or generating exports leading to manufacturing in India with technologies developed by the R&D companies with innovative ideas and intellectual properties. The larger companies need not get involved in developing the technologies and can instead concentrate on absorbing and upscaling the technologies.

This will also lead to the development of 'Indian Technologies' ie self-reliance. The revenue loss to the government will be limited to the tax incentives to the investors in the R&D companies. Such a loss will be much less than the incentives given to the large companies where the scale of operations even for R&D are big due to large overheads. The technology costs and the product costs will be lower. Resulting products will be more competitive as compared with the multinationals which import the entire technology for similar products.

In the past the government had given tax credits to R&D companies themselves. The units needed to be registered with the Ministry of Science and Technology. However, that provision has expired in 2007. The proposed tax code changes will not only remedy that problem but will also expand the scope by giving incentives that will result in capital formation. This is a step India can and MUST take. I wish the Country every success! USA



Sharad M Marathe

The writer is the founder and Chairman of Universal Technical Systems – a technical software company that operates in United States and India. He holds masters degrees in engineering and business management – both from the US. Previously he had developed the Software Technology Park scheme in the early 1980's in India. This scheme has been a major reason for the growth of the Indian software industry from less than US\$ 30 million in 1984 to over US\$ 60 billion today.





# THE INDIAN AIR FORCE AEROSPACE TECHNOLOGIES AND THE YEARS AHEAD

With increasing use of technology, emerge new playgrounds of conflict. They create new vulnerabilities and new rules of engagement, requiring a different genre of war-fighting wherewithal. These constitute strange unexplored arenas and are subject to new principles of war and yet undiscovered tactics. Smart weapons are being replaced by Worms, Trojans and Masquerades and seek new targets in communications and network systems, the denial of which can be equally devastating to the overall campaign.



In the light of an expanding strategic footprint of a resurgent India, the IAF must have a credible and demonstrable capability to operate effectively and decisively. The profound influence that aerospace power has because of its inherent speed, flexibility, reach, stealth, precision and ubiquity makes it the natural instrument of choice for the national and military leadership to address all conventional and sub-conventional conflict situations, humanitarian aid situations and most importantly force projection, as and when required to further national interests. The IAF therefore needs to be structured, equipped and trained to do this and much more! Clearly, the IAF must be equipped for long-reach, persistence, precision targeting, air dominance, net-centricity and space-enabled capabilities. This requires hardware, organisation and people. The hardware must be well chosen and procured in time; the organisation must be adaptive and the people must be competent, motivated and well-trained. The acquisition, upgrade and infrastructure build-up plans of the IAF have been well conceived over the years and slated to be achieved by 2022, provided their pending and in-the-pipeline procurement plans are addressed with speed and transparency by all stakeholders.

## National Options

There is no doubt that aerospace power will be the primary option and instrument of choice in any future conflict. Projection and application of aerospace power is premised on technology – acquiring and assimilating this technology is going to be a huge challenge for the country and the IAF. The lack of or slow pace of this process will curtail national options, which in turn, will adversely impact postures and doctrines. Denial and selective availability of military and aerospace hardware from other countries will always be enmeshed in international relations and therefore, indigenisation of core aerospace technologies must become a national quest. No nation can claim to be a major power without a high-level of autonomous and innovative technological capability. Almost 70 per cent of our military hardware is being sourced from foreign vendors today. As a growing economy with immense intellectual capability and industrial capacity, depending so heavily on imports in the defence sector, does not bode well for the country. Given the urgent requirement to modernise our armed forces, it would make immense economic, military and social sense if the government takes immediate measures to boost indigenous capability by energising and infusing some fresh vigour in the Indian aerospace industry, especially the private sector. A very significant characteristic that exemplifies the nature of aerospace technology today is the rate of change. Shelf lives of existing technologies are becoming shorter and are being overtaken by newer technologies at a breathtaking

**The very factor responsible for increasing one's capability naturally becomes a target for the adversary**

pace and this fact has a direct implication in the modernisation process. The development cycle of a product from the design to induction stage has to reduce; otherwise the equipment runs the risk of becoming obsolete in its entirety. This certainly cannot happen in the IAF, given the security scenario in the neighbourhood. There is a need therefore, to identify core technologies that need to be developed – and these must be aggressively designed and manufactured. If this is not done in time, we run the risk of being saddled with investments outside – and this does not add value to our existing state and denies us the opportunity to be self-reliant.

## Focused R&D

We need to collectively bring focus into our design and development activities – it must be clearly understood that we cannot design, develop and manufacture all our defence requirements. In the modern competitive environment, such practice is simply not cost-effective and nations the world over, are learning from the benefits of collaborations, joint ventures and a larger participation from the private sector. There has to be a better and more effective way to focus research and design activities in the country. Whilst the prevalent structures and organisations have served their purpose satisfactorily over the years and have brought the country to its present technological standard; it is time to evolve given the changing requirements of the IAF, costs to the nation and the security environment in our region.

Research and development activities in most other countries are undertaken by industry, in coordination with the government and universities. This is not the case with us, where R&D for military equipment is mostly restricted to Defence laboratories. We need to progressively move Defence research from the public to the private sector and into the capable minds and hands of young scientists and entrepreneurs.

## Design Process

The concepts of time bound processes, the ability to scrap a process if it does not meet the desired objective, the ability to take risks and timely decisions, are some truths that we could do well to absorb. Another crucial area is the requirement to increase user interface in the design process. It exists to some extent, but it has to take on a more intrusive and effective role. Industry must always translate user requirements into viable technical options. The user must always remain the 'Captain'.



**Air Chief Marshal Fali Homi Major PVSM, AVSM, SC, VM (Retd)**

The writer is Former Chief of the Air Staff. He is presently Member, National Security Advisory Board.



The last two decades have resulted in a comparative surge in aerospace industry in the country. This is an encouraging sign but if unregulated, it runs the risk of wasteful expenditure and duplication of effort. There is therefore a definite need for an apex agency, to co-ordinate and regulate the activities of the many organs and provide a focus to develop a coherent and comprehensive national aerospace capability.

### New Battlefields

With increasing use of technology, emerge new playgrounds of conflict. They create new vulnerabilities and new rules of engagement, requiring a different genre of war-fighting wherewithal. These constitute strange unexplored arenas and are subject to new principles of war and yet undiscovered tactics. Smart weapons are being replaced by Worms, Trojans and Masquerades and seek new targets in communications and network systems, the denial of which can be equally devastating to the overall campaign. These new battlefields form uncharted territory, add to the conventional ones already existing and demand an entirely new set of skills and equipment. Technology in an Air Force largely dictates capability. Indeed, one could go so far as to say that technology is the core driver of an aerospace power. Along with the abilities and capabilities that advancements in technology provide, are also the vulnerabilities generated alongside. The very factor responsible for increasing one's capability naturally becomes a target for the adversary. Implicit in attaining a capability is an understanding that its denial is also a consequence and hence sets in motion yet another chain of never-ending, cause and effect. Space, cyberspace, urban warfare and the information domain have emerged as new battle-spaces. These demand serious attention. There are probably many others, yet unknown, that would emerge. They obviously need very different sets of equipment, tactics and warriors to carry forward the battle. The IAF needs to predict and define the emergence of these new arenas and develop capabilities to dominate them as well. Battle-space leaves no vacuum. Domination will remain with the agency that makes its first inroads and develops these capabilities. The IAF needs to be proactive, monitor emerging battle-spaces and prepare for them.

### Man Management

Possession of assets alone, does not automatically translate them into capabilities. Making the right



**The IAF needs to be proactive, monitor emerging battle-spaces and prepare for them**

use of the equipment by generating suitable tactics, doctrine and training will decide the eventual outcome. This process will have its own gestation cycle – trials / development and exploitation phase and this cycle cannot be wished away. The response mechanism of likely adversaries, in the face of these changes, will continue to be dynamic and demand rapid counter-responses. This is an operational imperative which has to be accepted and addressed. Maintaining and utilising the newly acquired equipment needs modern training facilities, infrastructure and additional equipment. The organisation needs to identify personnel, plan their profiles and position them accordingly. It is essential that this process must remain relevant and co-incident with the acquisition and modernisation plan of the IAF. Every organisation has inertia and it tends to gravitate towards established patterns – in fact, looks for traditional and time-honoured methods. The IAF leadership must address the exacting demands of technological change and balance it with present requirements, putting together an organisation that is responsive enough to absorb these changes, before the next set of changes comes along. The balance is, indeed,

a thin line to tread.

### Seamless Integration

The Indian Air Force is poised at the threshold of a transformational change. It is also a moment of great opportunity. Today, aerospace technologies are evolving and changing at a rate, which has been unprecedented in human history – time has assumed the importance of a weapon today!! Whilst the concept is not new, domination and control over the temporal, assumes an altogether different dimension. It throws up challenges in the quest for enhanced capabilities and addressing these challenges constantly, will keep the IAF leadership busy in the years to come. The future, as always, remains uncertain and one can only make informed presumptions. The requirement to create an appropriately responsive organisation, managing processes that move in different operational environments / speeds and then seamlessly integrating all these requirements of acquisition, employment and training, are the major challenges that the Indian Air Force will face in the future, as it establishes itself during these years of transition. If the IAF is successful in establishing firm foundations in this modernisation process, it will leapfrog a generation ahead! **DSA**



## INDIGENISATION OF AVIATION

HAL and IAF's Base Repair Depots (BRDs) have mastered the art of licensed production and overhaul. Thousands of mostly British, French and Russian aircraft have been built. While production quality may have been an issue, they have served the IAF well. A large number of Indian manufacturers are assembling sub-systems for the big foreign players. But the ratio of 'real' indigenous content versus imports has actually progressively deteriorated from 45 to 36 per cent.

Prime Minister Modi has raised the 'Make in India' banner. There is no doubt that for any country to be a global power, it has to have a strong indigenous defence industry. By placing IIT graduate Manohar Parrikar as Defence Minister, he has signalled resolve. The initial signs are very positive. Hike of FDI in defence production; revamping Defence Research and Development Organisation (DRDO) through younger laboratory directors; and coordinating private sector participation are great initiatives. We are in a dismal state in defence production. Low investment in R&D; socialistic workforce with low productivity; generalist bureaucracy controlling and deciding technical activities; grown from the ranks and often fatigued PSU higher management; and lack of initiative and drive to achieve results. Aviation specific, LCA is over thirty years behind schedule; Intermediate Jet Trainer (IJT) has serious technical problems; Basic Trainer Aircraft (BTA) is not even on drawing board. The Russia led Fifth Generation Fighter Aircraft (FGFA) and Medium Multi-role Transport Aircraft (MTA) joint programmes are facing delays and unacceptable design and development cost escalations. Private industry is pussy-footing their entry because of high investments coupled with uncertainty.

### State Of The Industry

China has risen to be the fifth biggest weapons exporter. In the same period India replaced China as the number one arms buyer importing 12 per cent of the world's total sales. India's DRDO, Ordnance Factories (OFs) and Defence Public Sector Undertakings (DPSUs) like Hindustan Aeronautics Limited (HAL) were in place in initial years after independence. Yet 68 years later India imports around 70 per cent of its military hardware. In aviation we are nothing more than a foreign licensed-production house. The case in point is the manufacture of MiG series, Jaguar and Su-30 MKI fighters; Avro and Dornier light transport aircraft and Chetak and Cheetah helicopters. Aircraft production quality has often been in question. Many aircraft accidents have been attributed to HAL's quality control. High import content makes India vulnerable to supply lines being choked at inappropriate times.

### Major Projects

HF-24 Marut was India's first major aircraft design and development project in the 1960s. It had a great airframe, designed by German designer Kurt Tank and flew first in June 1961. Though 165 were built and operated, the aircraft had a very



**Air Marshal Anil Chopra**  
PVSM, AVSM, VM, VSM (Retd)

The writer was a pioneer of the Mirage 2000 fleet and commanded a Mirage Squadron, two operational air bases and the IAF's Flight Test Centre ASTE. He was the Team Leader of an aircraft upgrade project in Russia. Currently he is a member of Armed Forces Tribunal at Lucknow and a member of Executive Council of Jawaharlal Nehru University, New Delhi.



under-powered engine and was mired with maintenance problems and lived a short life. HAL's HT-2 basic piston-engine trainer was influenced by the design of DHC-1 Chipmunk. A total of 169 of them were used for training from 1953 to 1998. The HAL built Kiran (HJT-16) intermediate stage trainer was evolved from the British Jet Provost design. Beginning 1968, a total of 251 aircraft were inducted and continue to serve, though spares are difficult to get. HAL made HPT-32 replaced HT-2 in 1984. However the aircraft was highly under-powered and mired with repeat engine failures. After 23 pilots died in 17 crashes, the aircraft was permanently grounded in July 2009. In 1997, HAL began design work on an Intermediate Jet Trainer (IJT) designated HJT-36 Sitara. After 15 years of design and development, HAL admits that the IJT needs basic design review. The then defence minister Arun Jaitley informed the Parliament in August 2014 that the IJT programme was well behind schedule and has not so far been able to resolve critical wing and airframe design and development issues related to stall and spin. To circumvent the stall and spin characteristics problems help of a foreign consultant was sought, who suggested major airframe modification that could push the programme further back. Till date over ₹ 4,000 crore have been already committed. The 73 IJT aircraft with associated spares and equipment would require multiples of additional funds. With the heavier Russian engine the final performance may remain in question. HAL BTA has yet to be given a go ahead. Intermediate Jet Trainer (IJT) experience indicates that even if given go ahead today; the HTT-40 could join the IAF not earlier than 2022.

HAL's Advanced Light Helicopter ALH Dhruv was announced in 1984 and first flew in November 1992. Mired by sanctions after India's Pokhran-II nuclear tests slowed its development and it finally entered service in 2002. It flies with all the three Indian Armed Services and Border Security Force. Limited numbers have been exported or gifted to Nepal, Ecuador, Israel, Maldives, Turkey, Peru, Mauritius and Suriname. Civil variants are flying with government departments. The aircraft had serious weight and vibration issues in the initial years. At least nine aircraft have crashed in accidents due to technical reasons. Dhruv-WSI is the weaponised version called Rudra. The same basic platform is being used to develop a Light Combat Helicopter (LCH) and Light Observation Helicopter (LOH). Over 200 have been built till date. We can safely term the ALH an Indian aircraft design and production success.

DRDO designed, HAL built Light Combat Aircraft LCA Tejas has had a long history. As far back as 1969, Indian government decided that HAL should build a tactical air-support aircraft. HAL completed initial design studies by 1975 but could not proceed further due to non-availability of engine. In 1983 IAF projected requirement for MiG-21 replacement with a timeline of mid 1990s. In 1984, around the time of induction of Mirage 2000, Aeronautical Development Agency (ADA) was formed to manage the now envisaged LCA. It was to serve as

a vehicle to develop all attendant aviation technologies and advance India's aerospace capabilities. ADA was to coordinate with over 100 Defence laboratories, industrial organisations and other institutions for design and development and HAL was to be the manufacture house. The LCA was to have indigenous fly-by-wire controls, pulse-doppler radar and a turbofan engine. The IAF has a requirement of at least 200 single-seater and 20 twin-seater aircraft. Indian Navy needs 40 to replace Sea Harriers. The aircraft achieved Initial Operational Clearance (IOC) in December 2014. Recently on 17 January the first aircraft was handed over to IAF in a much publicised ceremony. The optimists expect the Final Operational Clearance (FOC) by early 2016. It requires 500 successful test flights to achieve it. The full complement of the first squadron is expected by 2017-18. While it is claimed that LCA has 70 per cent indigenous components, currently it has GE F-404 engine, an imported radar and large number of other foreign sub-systems. The aircraft currently does not meet the performance specifications. It is proposed to be replaced by the more powerful and bigger GE 414 engine which would entail a total redesign and fresh flight testing. The new aircraft LCA Mk II may join the service 10 years hence. HAL has also to ramp up production numbers.

Undoubtedly HAL and IAF's Base Repair Depots (BRDs) have mastered the art of licensed production and overhaul. Thousands of mostly British, French and Russian aircraft have been built. While production quality may have been an issue, they have served the IAF well. A large number of Indian manufacturers are assembling sub-systems for the big foreign players. But the ratio of 'real' indigenous content versus imports has actually progressively deteriorated from 45 to 36 per cent.

### What Ails Indian Aviation?

It is important to look at each element. The Service Headquarters are often blamed for making unachievable Service Qualification Requirements (SQRs). When the SQRs are made they cater to the already proven and operational technologies; threat perception and availability with the enemy; and timelines of final delivery. Defence industry is also chary about the Armed Forces changing SQRs mid-stream. This invariably happens when the project is unduly delayed and the whole world has moved on ahead. In the end Service HQs on their own or due to circumstances are forced to compromise and dilute specifications. HAL and other DPSUs often pitch for products well beyond their current know-how. Often they offer fully imported products with a 'Made in India' tag. Notwithstanding, the military is nationalist in view and wants to encourage Indian products.

The DRDO and DPSUs are government controlled organisations which follow seniority based system of individual growth. The salary structure is linked to years in service and not performance. The brainy guys leave early for better pastures. No wonder over 30 per cent scientists in US space agency NASA are

Indians. Accountability and answerability has been low. Small demand and huge infrastructure affects economies of scale. R&D products must translate into inductable end products. Similarly, the Ordnance Factories are mammoth set-ups run in old dilapidated buildings with a low industrial technological base. They have not moved much forward in their product lines. They are also manufacturing personnel clothing, shoes and small field items that can more economically be outsourced to civil industry. The OFs are also mired by active trade union activity that further lowers productivity. A full scale overhaul of DPSUs and OFs is required. Privatisation is the way. Embraer of Brazil is a successful model to emulate.

### No Level Playing Field

Private sector was allowed 100 per cent participation in Defence production in 2001. Lack of level playing field for the private sector vis-à-vis the DPSUs and the foreign original equipment manufacturers (OEMs) continued to dampen the initial enthusiasm. The access to the military's 15-year Long Term Integrated Perspective Plan (LTIPP) was to help industry plan ahead. The Defence Procurement Policy (DPP) has been made more India friendly. Indian industry has become a hub for world's auto industry. Its software strengths are unmatched. Tata Power and Larsen & Toubro manufacture Pinaka multi-barrel rocket launchers. L&T was involved in developing a hull for a nuclear submarine for the Indian Navy, Tata Power is handling modernisation of airfield infrastructure for IAF and Reliance Industries is active in aerospace and homeland security. Mahindras are ready to make a small aircraft. Pipavav Defence is already producing Defence products. EADS unit Cassidian wants to make India a hub for large number of Defence products that are locally manufactured and also offer technological value. BAE's US arm plans to shift howitzer assembly to India. There is also a large maintenance, repair and overhaul (MRO) market which can create R&D base for engineering services. Industry also awaits rationalisation of the tax structure that will promote value-addition in the country. It is time to assure industry of some orders. If we can have a successful space and nuclear programme; we should succeed in aircraft production.

Many countries have allowed FDI in Defence but kept the 'ultimate' veto share. In France, UK and Germany, FDI in defence industry requires government approval. USA puts restrictions on any FDI in any type of industry if it can threaten its national interest. Notwithstanding the apprehensions, it is not easy for a foreign investor to antagonise the local government which can easily put export restrictions and cancel all local orders.

### Realities

Two major manufacturers Boeing and Airbus control bulk of the civil aircraft market; half a dozen players control business jet market; Lycoming makes more than



50 per cent of world's engines for small propeller aircraft; there are only 5-6 jet engine manufacturers; only three countries have reasonable access to stealth technology. The transfer technology contracts are most difficult to interpret and implement. There have been Transfer of Technology clauses in many contracts but physically nothing significant has been transferred. India has been unable to leverage its high imports on this count. No one wants to share 'up-end' technology even for money. With limited access to technology alternative means will have to be found. Soviet Union and China rode to aviation success by reverse engineering western aircraft designs. Joint-ventures are the only interim option for India. It is thus time to recast ourselves for the daunting task of indigenisation. In the long run large sums have to be invested in 'focused' Defence R&D. USA and Russia have traditionally given high priority to research institutions and China earmarked US\$ 25 billion for this purpose in 2014.

### Way Forward

Arms industry is a closed sector with few players and difficult entry. Rules for India-based joint ventures with foreign partners need relaxation. Over 50 per cent indigenous content has to be insisted. DRDO and Defence PSUs need to be made efficient and answerable. In the long-term privatisation is the answer. Meanwhile, position well paid professionals to head important projects. India has to find more funds for R&D like USA and China to support industry? Is it time to think out of the box? Can we think of strategic sale of part of DRDO and some DPSUs to Indian corporates like Reliance and Tata? Till we get our technological prowess, there is a need to take steps to leapfrog by collaboration with industry partners from within and outside the country and take advantage of the 'offset' policy. In addition to the economic benefits, increased jobs, improved capability and the development of critical technology, indigenisation would ensure India has ready access to the best available Defence equipment. A key issue bothering the industry is the high cost of capital, both for servicing large infrastructure investments as well as small and medium sector promotion. As this is a capital-intensive industry, overseas borrowing norms can be relaxed for these segments. In view of very scarce resources, FDI in the Defence sector could be the most effective catalyst for self-reliance. It is time for the new Defence Minister to ensure India gets its act together. 



# WINNING THE WAR WITHOUT WEAPONS

## ELECTRONIC AND CYBER WARFARE

In modern warfare EW has taken a pre-eminent place than just being a force multiplier. Over the years the Indian Armed Forces have been consciously making efforts to upscale this capability. It is now equally important to pay attention to the aspects of cyber war, as it could be a 'game changer' in the future conflicts. In order to ensure an integrated approach to this essential capability, the need for forming at the earliest a tri-Service cyber as well as Space commands cannot be over emphasised.

*"No enterprise is more likely to succeed than one concealed from the enemy until it is ripe for execution".*

— Niccolo Machiavelli  
The Prince, 1521 AD  
From USAF EW Doctrine

US President Barack Obama in his State of the Union address on 20th January referred to his government's resolve in ensuring cyber protection. In the light of North Korean cyberattack on Sony Entertainment channel and subsequent US reprisal, the very fact that such reference was made in this important Presidential address to the nation, indicates the importance cyber warfare is gaining in this era of net-centricity.

### Dominating EM Spectrum

Battlespace today is increasingly dependent on the use of electromagnetic (EM) spectrum. While Network Centric Warfare (NCW) has become essential form of operations, protecting such a capability is becoming equally challenging. Apart from radar emissions and various types of Information Technology (IT) enabled communications, the increasing dependence on cyberspace for the command and control functions makes EM spectrum vulnerable to the integrated domains of electronic and cyber warfare. Defending newer disruptive technologies fielded to disable or degrade both, the hardware as well as the software, is therefore a daunting task. This was amply demonstrated during 'Operation Orchard', the successful attack by Israeli Air Force on a nuclear reactor under construction in Northern Syria, on 06th September 2007. A specially programmed UAV, similar to US Suter airborne network attack system, had apparently sent an embedded bug as part of the reflected radar echo to one of the Syrian Air Defence radars. This false echo had in turn disabled the entire AD network for a considerable period of time, allowing the Israeli F-15s and F-16s to destroy the site without any resistance from the Syrian AD missiles or interceptors. While downing of Malaysian Airline flight MH-17 by a surface-to-air missile has made news, 'YouTube' also demonstrates the fitment of deception capability on civil airlines of Israeli Elta-ELM 2160 Flight Guard against a shoulder fired missile.

While Marconi invented the wireless radio communication in 1896, the first known use of

interception and spoofing of a radio message has been reported in the Russo-Japanese Naval Battle of 1905. An initial form of Electronic Warfare had taken birth. Later it was in the Second World War that the techniques of jamming adversary's radars gathered momentum. Suppression of Enemy Air Defence (SEAD) operations by F-4G Phantom aircraft became a necessity in the Vietnam War, with Wild Weasel aircraft of the US Air Force used extensively to jam the Vietcong radar and missile systems. It is reported that due to their contribution, the USAF aircraft losses came down by nearly 70 per cent. In the 1967 War Israel had used communication jamming extensively. But it was in the midst of Yom Kippur War of 1973 that the need for a robust yet agile EW capability came to the fore, to minimise initial heavy Israeli aircraft losses to different varieties of Egyptian AD missiles.

### Only Kinetic Attack

The Indian Air Force started building Electronic Warfare capability only after the Indo-Pak 1971 War. Till then both India and Pakistan were yet to acquire low-level radar coverage and surface-to-air missile defences. As such, low-level attacks were reported mainly by visual observers or MOPs. In both 1965 and 1971 Wars, IAF had resorted to few aerial attacks against Pakistani radar located at Badin. However, in these wars there was lack of any specific IAF strategy for neutralising the command and control capability of Pakistan.

With Pakistani deployment in the 70s of low-level chain of MPDR sensors, terminal AD missiles like the Crotale and an integrated airborne interception capability, the IAF had to embark on rapid build-up of EW resources. In 1978 a dedicated EW squadron, with a mix of Canberra and MiG-21 aircraft was formed, fitted with standoff and escort pods respectively; to provide a suppressive shield to the embedded strike force. Strike tactics were evolved based on 'burn through' ranges for the terminal attacks.

Gathering of Electronic intelligence (ELINT) and Communications Intelligence (COMINT) became essential, but accuracies in locating and in particular 'fingerprinting' the Pakistani sensors needed much better technology for the interception equipment.

In the Bekaa Valley War of 1982, the Israeli Air Force had aptly demonstrated the need for accurate ELINT and effective use of EW, which had neutralised the Syrian Air Defence network, along with partial incapacitation of their Command, Control and Communication (C3) system. Since the Syrians were using similar Soviet sensors and interceptors, the lessons were somewhat worrisome for the Indian

Air Force. The inbuilt Soviet EW equipment lacked versatility as well as adequate power output. As such, the IAF had to import EW pods from countries such as Italy and France. That is when IAF mastered the art of configuring Western equipment on varied Soviet platforms. Due to limited radii of MiG-21 EW escort aircraft, emphasis was also laid on acquiring Airborne Self Protection Jamming (ASPJ) pods.

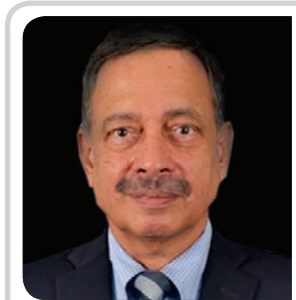
The USAF doctrine of 'aerial dominance' displayed in the Gulf Wars highlighted the need to attack and disable enemy's C3 system, in the initial stages of war. By destroying the radar network along with communication grid makes the enemy not only 'deaf and dumb' but also 'blind'. For the past few years the IAF as well as Indian Army and Navy have been on the path to acquire similar capability. Acquisition of better signal intelligence (SIGINT) capability, both ground based and airborne, provides the IAF with a more accurate Electronic Order of Battle ie EW ORBAT.

**The increasing dependence on cyberspace for the command and control functions makes EM spectrum vulnerable to the integrated domains of electronic and cyber warfare**

The IAF inventory also possesses Anti-radiation Missiles (ARM) on manned and unmanned platforms, as well as improved ASPJ for protection against the terminal defences. However, most of this capacity build-up has taken place mainly against Pakistan, with not much information on the Chinese EW ORBAT.

### Indigenous Systems

Since EW systems are highly classified in nature, efforts for indigenous development were given priority from the very beginning. A specialist lab, DARE was set up by DRDO in 2001 by renaming ASIEO established in 1986, to develop specific electronic as well as avionics projects. DARE followed a collaborative approach with private industry partners such as CMC and Tata Power, as also with selected international companies. Over the years DRDO has become a 'single window' supplier of EW systems for the IAF and other two Services. It has developed a static as well as mobile ESM system Divya Drishti, capable of 'fingerprinting' sensors. It is also upgrading ESM capability of the ground based



**Air Marshal  
BN Gokhale  
PVSM, AVSM, VM  
(Retd)**

The writer was commissioned into the Indian Air Force in June 1968 in fighter stream. He has flown over 3,500 hours on a variety of combat and trainer aircraft. He has seen active operations during the 1971 Indo-Pak hostilities on both Eastern and Western fronts. He is a Qualified Flying Instructor and Fighter Combat Leader from the prestigious Tactics and Combat Development Establishment. He is a former Vice Chief of the Air Staff.





as well as airborne platforms of the IAF. The AEW&C *Embraer* aircraft will also have such capability. In order to cater to Service specific requirements, DRDO has also developed a comprehensive EW system known as *Samyukta* for the Army, which can also give useful inputs to the IAF. Along with UAV and Aerostat based ELINT and COMINT payloads, IAF should shortly be in a much better position to glean requisite information on adversary's EW ORBAT.

DRDO has also developed EW suites for airborne platforms with *Tarang* Radar Warning Receiver and *Tempest* deception jamming pods. *Su-30* is configured to carry the *Kh-31* anti-radiation missile and with the fitment of *Siva* High Accuracy Direction Finding (HADF) pods, cueing this missile for SEAD operations would bolster the IAF capability. Then there are other indigenous projects like missile approach warning system (MAWS) and directional infrared counter measures (DIRCM) for evading enemy's anti-aircraft missiles, to be fitted on all platforms including fighters, transport and helicopters. While Pakistan has already established an EW test and training range purchased from Turkey near Sargodha, DRDO is also building two test ranges in Southern India. The test ranges will not only be able to test various 'communication' as well as 'non-communication' EW systems,

but will also help in fielding varied electronic equipment to check the aspects of electro-magnetic interference (EMI) and electro-magnetic compatibility (EMC).

The IAF is in midst of inducting newer platforms including the much anticipated 126 MMRCA and the indigenous *Tejas* aircraft. But equally important is its emphasis on induction of force multipliers and support systems such as the AWACS, ground and airborne data linking, better interrogation friend or foe (IFF), airborne Active Electronically Scanned Array (AESA) radar on interceptors etc to name a few. Such enhanced capability would enable the IAF in carrying out 'silent interceptions' and other operations, somewhat immune to interference and 'noise'.


### Cyber War

While the emerging EW scenario seems quite encouraging for the IAF, it would be equally important to pay attention to the aspects of cyber war. Apart from the Israeli 'Operation Orchard', the Russo-Estonian stand-off of April 2007 and the Russo-Georgian conflict of July 2008 have lessons

for this new dimension of silent but unidentifiable enemy action. In both these conflicts most of the essential networks such as power distribution, communication network and even banking were bombarded by Distributed Denial of Service (DDOS) attacks, thereby causing a crash or jamming of the networks. Equally important was the aspect of not being able to trace the origin of attacks, as proxy servers had been used from remote out-of-country locations. Similar crippling effect on Net-centric Systems just prior to the start of a conflict can well change the outcome; especially in a short duration war envisaged in our region.

With almost entire hardware being imported for the Indian networks, there is a constant need to sanitise the systems from possible embedded bugs. Such 'trapdoor' or 'Trojan Horse' are known to lie dormant for a considerable length of time and are programmed to be activated by a routine system command, but in effect disabling the system. One such example of the disruptive capability of cyberattacks is of the Stuxnet malware injected through Siemens hardware into the Iranian uranium enrichment plant at Natanz, which experienced serious technical malfunction in November 2010.

In order to avoid direct attacks from the Web, Intranets within the Service need to be totally isolated. The computer ports need to be disabled to avoid insertion of any inadvertent or intentional viruses. There is also a need to establish standard operating procedures for an effective back-up and plans for disaster recovery. In this context a number of countries like US, Russia, China have created dedicated teams of cyber warriors and the Chinese are known to have a strategy known as Integrated Network Electronic Warfare (INEW) along with a doctrine to fight under such conditions. The Indian Armed Forces have been demanding for many years formation of Joint Cyber Command for similar capability.

In modern warfare EW has taken a pre-eminent place than just being a force multiplier. Over the years the Indian Armed Forces have been consciously making efforts to upscale this capability. It is now equally important to pay attention to the aspects of cyber war, as it could be a 'game changer' in the future conflicts. In order to ensure an integrated approach to this essential capability, the need for forming at the earliest a tri-Service cyber as well as space Commands cannot be over emphasised. 



**With almost entire hardware being imported for the Indian networks, there is a constant need to sanitise the systems from possible embedded bugs**

# PARTNERING INDIA TO MAKE IN INDIA

BAE SYSTEMS

INSPIRED WORK



BAE Systems is proud to be a founding partner of defence manufacturing in India. Since the 1960s when India built the Avro for the Air Force to our association with Hindustan Aeronautics Limited on Jaguar and India's very own production line for the Hawk Advanced Jet Trainer, we have partnered Indian industry by sharing technology and capability. We are excited to extend our Make in India legacy to the M777 Ultra-Lightweight Howitzer programme.

Beyond serving the armed forces, we are committed to help India develop a self-sufficient defence industry for India, in India, with India.

We believe there's never been a better time to Make in India.

[www.baesystems.com](http://www.baesystems.com)



# THE UNPOLISHED DIAMOND IN DEFENCE MANUFACTURING

The government too has its fair share of blame in protecting the public sector at the cost of the private enterprises and in a way to the detriment of capacity and capability build-up of the Services. Taxation laws are so heavily biased towards the foreign OEMs that Indian industry can never compete in the commercial bidding. With the present taxation laws (27 per cent Customs duty, 12.36 per cent Excise, 12.36 per cent Service Tax), an item with 30 per cent indigenous content made in India would cost 41 per cent more than if it was imported!

The Prime Minister's recent refrain of 'Make in India' has found the loudest echo in defence circles and for good reasons too. For far too long have we borne the shameful mantle of the largest arms importer of the world. It was former Defence Minister George Fernandes who had said in 1995 that within 10 years we should reverse the import-export ratio of defence equipment from 70:30 to 30:70. The reality has not changed to date and, unfortunately, will remain the same for some more years to come, with 70 per cent of our needs coming from abroad.

## Over-dependence On DRDO

There are two main reasons for this terrible situation that we find ourselves in. Firstly, the reality that the Defence Public Sector Undertakings (DPSUs) and Defence Research and Development Organisation (DRDO) have miserably failed in the trust placed in them by the people of India to make nation self-reliant in arms and ammunition. Secondly, the effervescent Indian private sector has been kept out of defence manufacturing and R&D, initially as a deliberate decision of the government (brought about due to prevailing economic circumstances post-independence) but later due to a combination of pussyfooting by the government of the day and a focused attempt by interested parties to keep them out. This article makes a case for the absolute imperativeness of getting the private sector into defence R&D and manufacturing ASAP.

At independence, India had 16 ordnance factories making very low technology items; the aim of the British had been clear – to get major hardware from home (so that their industries prospered) and Indian ordnance factories to produce secondary items to sustain them. Thus, there was no armament industry worth the name as the nascent nation took steps to face the massive challenges confronting its polity. It was but obvious that the industry would require infusion of finance that hardly any private individual or finance house possessed. The government took up the mantle and the first DPSU, Bharat Electronics Limited was set up in 1954. Simultaneously, with centralised planning being the mantra and socialist ideology having a bigger say due to the endemic

poverty that gripped the majority of the population, the industrialisation policies of the nation took on leftist leanings. Thus, the Industrial Policy announced in 1956 had three schedules, of which Schedule A kept basic industries in the domain of the state; Schedule A included defence manufacturing and thus commenced the stranglehold of the public sector in defence R&D and production. Over the years, ordnance factories numbers have increased to 39 and eight DPSUs have hogged the lion's share in defence equipment orders. To advance R&D in the defence sector, the DRDO was established in 1958; the vision of DRDO is to "Make India prosperous by establishing world-class science and technology base and provide our Defence Services decisive edge by equipping them with internationally competitive systems and solutions." The reality is quite the obverse.

The output of DRDO has suffered due to lack of accountability which has been adversely commented upon by umpteen committees, including the Standing Committees of Parliament on Defence down the years – a simple Google search would show how dismal the situation has been. Time overruns of projects, some to the tune of a decade or two (LCA and IJT are prime examples) and cost overshoots by multiples of three and more, but still precious little to show, has been the norm. The number of projects foreclosed due to lack of progress has been large but still no one has been pulled up for losses to the exchequer. DPSUs, that have the Services as their captive customers, have been equally guilty due to their poor work culture and ethics causing delayed production and shoddy workmanship.

## Unionised Workers' Opposition

The government brought in the Defence Procurement Procedure in 2002 post-Kargil in an attempt to bring in transparency and to spread the procurement net wide, including from the private sector. The biggest path-breaking suggestion was the creation of Raksha Udyog Ratna (RUR) amongst the private players in order to get them benefits that are accorded to Maharatna enterprises amongst the DPSUs. A high powered committee headed by the Defence Secretary, with an industrialist, a private banker and Chairman HAL as members, shortlisted 12 industrial houses



(of the likes of Tata, L&T, Mahindra, Bharat Forge etc) for being accorded RUR status. This unique move would have galvanised the private defence entities but was sabotaged by DPSU worker unions to which the government succumbed. The controls have thus remained with the DPSUs and the private players have remained small component suppliers to them.

## Taxation Burden On Private Sector

The government too has its fair share of blame in protecting the public sector at the cost of the private enterprises and in a way to the detriment of capacity and capability build-up of the Services. Taxation laws are so heavily biased towards the foreign OEMs that Indian industry can never compete in the commercial bidding. With the present taxation laws (27 per cent Customs duty, 12.36 per cent Excise, 12.36 per cent Service Tax), an item with 30 per cent indigenous content made in India would cost 41 per cent more than if it was imported! While the Services can buy armament from a foreign private enterprise, Indian entities are barred under the Explosives policy from making armament, a sector reserved solely for Ordnance Factories and Bharat Dynamics Limited (for missiles). Similarly, while other sectors are eligible for tax holidays to help them set up shop (infra, power, telecom, shipping, refinery, fertilizer), no such dispensation is available for the defence sector. This has led to the development of a vicious cycle of an overload and surfeit of orders for the DPSUs while their capacity to fulfill them in time remains woefully inadequate. This has caused extensive delays, a situation magnified many times over by the practice of nominating only a DPSU for Transfer of Technology in Buy and Make cases, which loads the order books even more.

## Bleak Future

With such a precarious present, the future looks even worse when one considers the large number of acquisitions that are staring us in the face. A sample listing, only for the IAF, would include MMRCA, Advanced Medium

Combat Aircraft (AMCA), Multi-role Transport Aircraft (MTA), Fifth Generation Fighter Aircraft (FFGA), UAVs, ALH, LCH, LUH *et al* for HAL while for Bharat Dynamics Limited it would include the multitude of missiles and for Bharat Electronics Limited it would be radars and other electronic equipment. To reiterate, the other Services have an equally large number of pending projects for these and other DPSUs, so the situation is pretty bleak. So, where does one go from here?

## Greater Involvement

There is but one option left for the government – get the Indian private sector involved in defence manufacture, which has been so effervescent and in the forefront in other manufacturing fields. The following steps are a must to achieve this objective, which need to be taken up with a missionary zeal if our efforts are to bear fruit:

First, the Defence Procurement Procedure which is under revision, must enable government funding for private players to conduct R&D. If crores upon hundreds of crores have been lavished on DRDO with precious little to show, why not financially empower the private sector to conduct R&D and demand accountability from them. The private players are as nationalistic as anyone in government service and deserve to be trusted.

**A major part of technology under the offsets clause must flow to the private sector to fast-track the process of indigenisation, as such huge offset capital cannot be absorbed by the public sector alone**



**AVM Manmohan Bahadur VM (Retd)**

The writer retired from the Indian Air Force after 36 years of distinguished service. He is an Experimental Test Pilot from the French Test Pilots School, a graduate of the Air Command and Staff College, USA and a postgraduate in Defence and Strategic Studies from Madras University. He has commanded a frontline Helicopter Unit and two Flying Bases, was the Contingent Cdr of the first IAF United Nations Mission in Sudan and has been Head of Training (Air) at Defence Services Staff College, Wellington. As Asst Chief of Air Staff, he was the operational head of Transport and Helicopter Operations of the Indian Air Force for two and a half years. His last assignment was as Asst Chief of Integrated Defence Staff in charge of perspective planning and force structure of the Services. He writes for leading national newspapers and professional journals and his core interests concern Air Power and Strategic Affairs. He is a Distinguished Fellow at the Centre for Air Power Studies, New Delhi.





Thirdly, reform the Defence Offsets Management Wing (DOMW) for proper assimilation of technology that is to flow with the innumerable high value contracts that are in the pipeline. It is imperative that the 12 to 15 per cent marked up price that is paid in a contract with offsets is made use of fully. As per one estimate, the cumulative market for offsets would be around US\$ 68 billion by the end of the 13th Plan (2022) and approximately US\$ 130 billion by the end of the 14th Plan (2027). A major part of technology under the offsets clause must flow to the private sector to fast track the process of indigenisation, as such huge offset capital cannot be absorbed by the public sector alone.

**Special Steering Committee**

Fourthly, someone has to be made incharge of the nation's desire to set up a Military Industrial Complex (MIC) – 'someone' has to have ownership, which is not the case at present as everyone just wants to finish his tenure and move on. And that 'someone' must have belief and faith in the power of the Indian private sector to deliver results. He or she must be given a long tenure (not for a year or two) as also his team members, who must be quasi-permanent. Other ministries and departments who have a say in the process of setting up the MIC viz taxation, excise, department of foreign trade, industrial promotion, heavy engineering *et al* and who bring with them a multitude of laws and by-laws that would affect the setting up of any new industry must be included under one roof so as to implement the military's very basic principle of Unity of Command. Give ownership of implementing the government's vision of defence indigenisation to this group – give them the powers, trust them and demand results. There is no other way out.

**Someone has to be made incharge of the nation's desire to set up a Military Industrial Complex (MIC) – 'someone' has to have ownership. He or she must be given a long tenure**

Secondly, the 52 national laboratories of DRDO are national assets and should be made available to private industry on payment for R&D work. Setting up labs, especially when a production order is not a certainty, is a very costly proposition which very few can afford. If we need true path-breaking indigenous research, such affirmative action has to be taken.

The Indian arms market is so huge that there is enough on the plate to be shared by the public and private sector. The public sector brings with it the advantage of priceless assets and government financial backing, while the private sector brings fresh ideas, a momentum different from that of the DPSUs and that one ingredient in short supply – accountability. It is for the government to harness the strengths of the two sectors to set in motion the drive to set up an MIC. The path is long and torturous and too much time has been lost with the shameful yoke of 'largest arms importer' dirtying the fair name of India. It is time that some determined and forceful steps are taken by the government by empowering the private sector in defence manufacturing and R&D. **USA**

# BRAHMOS SUPERSONIC CRUISE MISSILE

World Leader in Cruise Missile Family



**SPEED | PRECISION | POWER**

**Visit us  
Hall E,  
Pavilion 1.1**

**MULTIPLE PLATFORMS  
MULTIPLE MISSIONS  
MULTIPLE TARGETS**



**BRAHMOS AEROSPACE**

16, Cariappa Marg, Kirby Place, Delhi Cantt.,  
New Delhi - 110010 INDIA  
Tel.: +91-11-33123000 Fax: +91-11-25684827  
Website: www.brahmos.com Mail: mail@brahmos.com



# INDIAN AIR FORCE IN THE 21ST CENTURY

The Long Term Perspective Plan (LTPP) of the IAF, based on the perceived security challenges from the emerging geopolitical scenario up to the end of the Fourteenth Five-Year Plan, caters to the requirement of progressively building its combat capability to face a two-front conflict. The IAF is expected to maintain a reduced strength of combat squadrons until the end of the current plan, gradually increasing to 42 squadrons by the end of the Fourteenth Plan and 45 squadrons by its centenary year in 2032.

Fourteen years into the 21st century, on 08 October 2014, the Indian Air Force (IAF) celebrated its 82nd anniversary. Along with the celebrations, there was introspection, not just by the 'men in blue', but also by all associated with the IAF. The IAF, at the turn of the century, was very happily placed, with the country having a healthy economic outlook, giving rise to a good defence budget and a modernisation programme, discussed not just in the corridors of the Air HQ, but also in the Ministry of Defence (MoD), Parliament and in the print and electronic media. Efforts were on to propagate the Air Force vision of expanding itself into an aerospace force in the minds of the common-man and other elements of the armed forces. Somewhere down the line, the plans seem to have derailed, put on track and then derailed again.

The modernisation programme with new acquisitions did not take-off as planned. The contract for the much-talked-about Medium Multi-Role Combat Aircraft (MMRCA) is yet to be finalised, though the choice was made a few years ago after exhaustive testing of all contenders. Helicopters for the VVIP role were selected after ensuring a fair competition, but the delivery has been stopped and the supplier blacklisted, after taking over three helicopters, due to charges of paying a commission to win the contract. The three helicopters have been 'moth-balled', with an uncertain future. It is only the transport fleet, with its new acquisitions, that has provided a never-before-seen strategic capability in the IAF earlier and brought about some measure of cheer.

## Combat Fleet

Between the years 1979-1989, the *MiG-21* aircraft, in all versions, became the mainstay of the combat fleet when the IAF phased out its fleets of the *Gnats*, *Hunters* and *Maruts*, on completion of their total technical life (TTL) or obsolescence. The combat

capability, improved with the induction of the British *Jaguar*, Russian *MiG-23*, *MiG-27*, *MiG-29* and the French *Mirage-2000* aircraft, placed the IAF in a comfortable position in respect to its adversaries.

The *MiG-21* aircraft, in various upgraded versions, continues in service till date and makes up for more than a third of the IAF fleet strength; it is due for a total phase out by 2017, when the MMRCA is expected to be inducted, **if at all it is inducted** (emphasis intentional). The *MiG-23* fleet has already been phased out; the other fleets of the *MiG-27*, *MiG-29*, *Jaguar* and *Mirage-2000*, all with upgrades and 'life-extension', are likely to fly for another 10-15 years. All these aircraft are of the third-generation vintage and do not really project frontline combat capability, so direly needed today. The combat fleet strength of the IAF, is reported to have dropped to 34 squadrons as against the authorised strength of 39.5 squadrons, with every likelihood of a further drop to below 30 in 2015; a serious situation inconsistent with the preparations for a two-front scenario.

The first fourth-generation aircraft, the *Su-30MKI* was introduced in-service in 1997 and the IAF is expected to build its strength to 230 aircraft by the end of this year; another 42 aircraft have been ordered to increase the fleet strength to 15 squadrons, to cater for shortfalls in other fleets. With such numbers and modifications to carry strategic weapons, it would be the mainstay of the IAF for some decades to come. It is also understood that Russia has offered to upgrade the *Su-30MKI* fleet to fifth-generation standards.

Russia has also entered into a contract with Hindustan Aeronautics Limited (HAL) to develop a new fifth-generation fighter aircraft (FGFA), on the lines of the American *F-22 Raptor*. The aircraft for the IAF is designed to be a twin-seat, to be produced in India by HAL, with an initial order to equip 8-10 squadrons of the IAF, with an expected cost of US\$ 100 million each and a total outlay of



US\$ 30 billion, excluding the development cost. While the single-seat prototype has reportedly flown in Russia, there are some hiccups in the development of the twin-seat version; the series production for the Indian version is scheduled to commence only in 2019 and the induction to commence by 2020. With such timelines, the IAF can only hope to have the entire order with it and operational, by 2028 or thereabouts.

## MMRCA In Limbo

Clearance to purchase 126 MMRCA was accorded by the MoD a few years ago and from the shortlisted aircraft, the French *Rafale* was selected; the announcement to this effect was made on 31st January 2012 and the contract was expected to be signed by the end of 2013. There has been an inordinate delay, which, with any further impediments, will have serious repercussions on the delivery schedule, operationalisation of the fleet in the IAF and the overall combat fleet strength. There is little certainty of the time frame in which the contract would be ultimately signed, if at all it is signed, if the latest statements attributed to the current Defence Minister are any indication.

The indigenous Light Combat Aircraft (LCA) is yet to achieve its final operational clearance, though the initial operational clearance (IOC-I) was accorded, with much fanfare and promises, in 2011. The IOC-II was accorded some days ago and the first of the series production aircraft was handed over to the IAF on 18 January 2015. While the series production has commenced, the final operational clearance is expected only towards the end of the year. The IAF has plans to induct 120 LCA; the GE F-404 engine would power the initial 40 aircraft, while the remaining

**Increments in the operational capability of the combat fleet are an essential part of modernisation process of the IAF**

80 aircraft would have the more powerful GE F-414 engine, to exploit the aircraft to its full potential; an order has been placed by HAL with GE for 99 engines. It, however, remains to be seen when the aircraft will finally be inducted and fully operationalised by the IAF, to augment its combat capability.

## Major Fillip

In January 2008, the ageing transport fleet of the IAF got its first major fillip through an agreement with the US government for the procurement of six *C-130J Super Hercules* aircraft, for US\$ 1.06 billion, through the Foreign Military Sales programme of the US government. Subsequent to the induction of the aircraft and being operational, IAF has ordered for another six aircraft. Additionally, ten *C-17 Globemaster* aircraft, six of which are already in service, have been contracted for, through the same FMS route.

Apart from these new acquisitions, the old fleets of *An-32* and *Il-76* continue in-service with an upgradation / life extension programme. Replacement of the *An-32* aircraft is planned through a 100-seater multi-role transport aircraft (MTA) being developed as a joint venture with Russia. This is a 15-20 tonne class aircraft that would meet the tactical airlift



**Air Marshal  
Dhiraj Kukreja  
PVSM, AVSM, VSM,  
ADC (Retd)**

The writer retired as the AOC-in-C of Training Command, IAF on 29th February 2012. A pilot by profession, he has flown various fighter and transport aircraft. In his long stint in the Air Force of about 40 years, he has held many operational and staff appointments. Prior to taking over as the AOC-in-C, he was the Deputy Chief (Operations) in HQ IDS. He has commanded a premier transport squadron in the Northern Sector, Air Force Station, Yelahanka – the main transport training base of the IAF and the Air Force Academy at Hyderabad. He is the first Air Force officer to have undergone an International Fellowship at the National Defense University, Washington DC, USA. He is a postgraduate in 'National Security Strategy' from National War College, USA.





requirements of the Air Force of both the countries. The earliest that IAF is expected to receive the first aircraft is 2018-19, though not much is known about its progress. The *Il-76* has served the nation well and will soldier on for a few years more. The IAF has done well in procuring the *Globemaster*, thus adding a qualitative dimension to its strategic airlift capability. There is the likelihood of the IAF furthering its capabilities through an additional order of another six to ten aircraft.

The previous government, in July 2012 had cleared replacement of the *HS 748 Avro* aircraft, procured in the mid-1960s. For the first time, HAL was not involved in an aviation project in the country, being overloaded with pending commitments. The induction, planned through manufacture by a foreign vendor, in a joint venture with the private sector in India, was aimed to give a boost to the indigenous aerospace industry. Prior to the general elections the tendering process was placed on hold to include HAL, but was then approved as per the original terms of reference, immediately after the formation of the new government. The procurement, however, has, once again, been placed on hold by the present Defence Minister who has questioned the very necessity of the acquisition! The first 16 aircraft were to be procured off-the-shelf and the balance 40 aircraft were to be manufactured in India.

Inductions in the rotary wing segment of the IAF are no less forceful than those of the transport fleet. Two major contracts are currently in the final stages, for 22 Boeing *AH-64D Apache Block III* attack helicopters, worth US\$ 1.4 billion and

for 15 *CH-47F Chinook* heavy-lift helicopters for US\$ 1 billion. Both have 'outgunned' their Russian competitors, *Mi-28* and the 'heavy-weight' *Mi-26*. The order book for the *Apache* helicopters will be enhanced as the Indian Army too, has been cleared to purchase 39 helicopters, once the initial order for IAF has been met.

The IAF has purchased the Russian *Mi-17 V5* to augment the existing fleet of the *Mi-17* helicopters, the induction of which has reportedly been completed. This four-tonne helicopter is an armed upgrade of the existing *Mi-17*; the IAF capability to undertake high-altitude air maintenance operations in Ladakh and Siachen sectors has been significantly improved with the induction, besides also helping in undertaking additional humanitarian missions, disaster relief and logistic support operations.

In the indigenous segment, induction in large numbers of the Advanced Light helicopters (ALH), *Dhruv*, is underway, notwithstanding the occasional technical failures experienced in the fleet. The weaponised version of the ALH, the light utility helicopters (LUH) and the newly designed light combat helicopters (LCH) are also being evaluated for further purchases in large numbers, both by the IAF and the Indian Army, whether purchased from outside the country or manufactured indigenously.

**The IAF, entrusted to look after the air defence of the nation, has also procured new radars and aerostats to replace the legacy systems**

**Other Acquisitions**

Increments in the operational capability of the combat fleet are an essential part of modernisation process of the IAF. There is focus on other areas

as well, where new acquisitions or upgrades would take the IAF to the end of the Fifteenth Five-Year plan in 2032, which also happens to be the centenary year of this Service.

The IAF has already in-service the *Pilatus PC-7* trainer aircraft as a replacement for the *HPT-32* aircraft. Seventyfive aircraft were contracted for in 2012, the delivery of which is likely to be completed by mid-2015. The option to procure additional 106 aircraft was exercised in March 2014, after assessing the tardy progress of HAL built Intermediate Jet Trainer (IJT) and the *HTT-40* basic trainer aircraft. The IAF now aims to acquire 10 of 106 *PC-7s* off-the-shelf, 28 in 'semi-knocked-down' kits and the remaining 68 in a 'completely-knocked-down' configuration, for assembly at the Base Repair Depot (BRD) at Sulur. If this new government does not hold back the scheme, IAF would meet its requirement of 181 aircraft for basic training of pilots.

The IAF, entrusted to look after the air defence of the nation, has also procured new radars and aerostats to replace the legacy systems, which will see it through to the end of the Fourteenth Five-Year Plan, if not beyond. Radars of different types, some indigenous, are already in-service, while others are in the pipeline and would plug the gaps in radar surveillance. The IAF was also the first in the region to acquire airborne warning and control system aircraft (AWACS); it is progressing with the acquisition of an additional three aircraft to bring the total to six, while also procuring a different airborne early warning and control (AEW&C) aircraft based on the *Embraer-145* platform.

Alongside the acquisition to boost

the surveillance capabilities, both from the ground and air, are the force-multipliers in the form of Flight Refuelling Aircraft (FRA). After the initial acquisitions, the proposal to acquire six additional FRA has been cleared, with the IAF opting for the *Airbus A-330 MRTT*. With its true wide-body fuselage, the *A-330 MRTT* is ideal to carry any kind of military or humanitarian payload on strategic missions, without requiring any additional fuel tanks for air-to-air refuelling and hence, avoiding any reduction in its ability to carry passengers or cargo.

With such high technology aircraft and weapon systems, the IAF has also focused on upgrading its operating environment at the airfields with state-of-the-art navigation and communication systems and seamless integrated networking for effective air defence command and control. In the near future, the IAF is also hoping to enter the fourth dimension with a dedicated satellite for itself.

**Contours Of Aerospace Power**

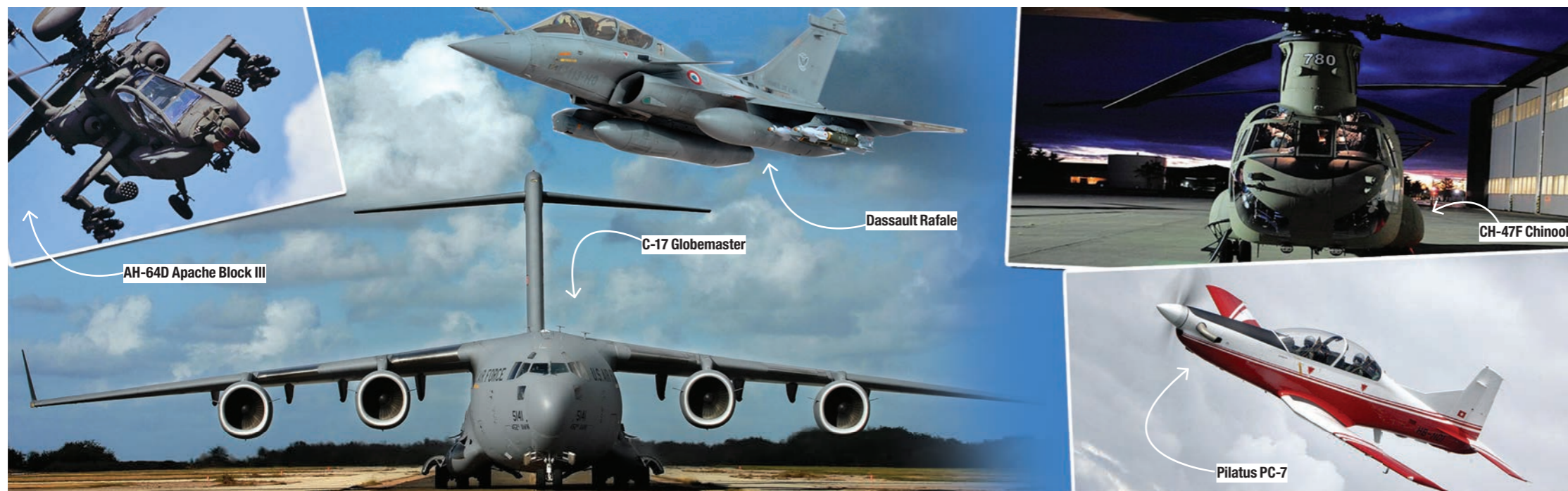
Any nation needs to possess comprehensive combat aerospace capability, emphasised by flexibility and speed of response, mobility and transportability of all forms of national power, to all parts of the country and even the world. Aerospace power fits the bill, as has been demonstrated in recent conflicts in various parts of the world. The need for such an aerospace capability is, therefore, inescapable for India.

**Any nation needs to possess comprehensive combat aerospace capability, emphasised by flexibility and speed of response, mobility and transportability of all forms of national power**

As the IAF celebrated its 82nd anniversary in October last year, the planning and dedicated effort of the staff at Air HQ and MoD, combined with some favourable decisions

from the political leadership seemed to have borne fruit to place the modernisation programme of the IAF on track, though a few years late. The current Defence Minister has amended some decisions; one needs to wait and watch the reasoning behind the amended decisions and whether the modernisation programme would be further delayed or accelerated through 'Make in India' plans.

The Long Term Perspective Plan (LTPP) of the IAF, based on the perceived security challenges from the emerging geopolitical scenario up to the end of the Fourteenth Five-Year Plan, caters to the requirement of progressively building its combat capability to face a two-front conflict. The IAF is expected to maintain a reduced strength of combat squadrons until the end of the current plan, gradually increasing to 42 squadrons by the end of the Fourteenth Plan and 45 squadrons by its centenary year in 2032. The IAF may have its wish list, but it needs the support of the budget and the political motivation, unhampered by bureaucratic interference, for the plans to become a reality.





# GRAND PLANS NEED PROPER IMPLEMENTATION



For the Narendra Modi government, the new year has begun on a superlative note. A highly successful visit of US President Barack Obama, was just the start the Modi government was looking for in its diplomatic engagements. For the Prime Minister, it was a personal triumph. In fact his 15-minute 'chai pe charcha' with Obama on the lawns of Hyderabad House is believed to have removed the last vestiges of a potential blockade in operationalising the six year old civil nuclear deal, taking the Indo-US relations to a more fruitful stage.

Two major obstacles – the American demand to allow tracking of nuclear material sourced by India and the American concern on the Indian liability law – were finally removed after the two leaders put their personal stamp on the solutions suggested by their respective officials.

Apparently, based on three detailed negotiations between the contact groups set up after Obama and Modi met in September, both sides hammered out a solution. The American side was firmly told that the liability law is in conformity with the text of the civil nuclear agreement signed earlier. New Delhi also pointed out that it will not allow any other arrangement outside the IAEA inspection regime that India has been practicing. Once it was clear that the Indians were not budging from their position, President Obama told his team to drop the unreasonable demand.

Prime Minister Modi referred to this development in his remarks at the joint press conference: "In the course of the past four months, we have worked with a sense of purpose to move it (civil nuclear deal) forward. I am pleased that six years after we signed our bilateral agreement, we are moving towards commercial cooperation, consistent with our law, our international legal obligations and technical and commercial viability," Modi said.

On the insurance liability clause, India has been telling the US that it will build a pool that will indemnify American reactor builders against liability in case of an accident.

Four government insurance entities led by General Insurance Company will create a pool of ₹ 750 crore to cover liabilities for both operators and suppliers of nuclear plants, MEA officials said at a briefing. President Obama too referred to the breakthrough in his opening remarks. "Today, we achieved a

breakthrough on two issues that were holding up our ability to advance our civil nuclear cooperation and we are committed to moving towards full implementation," Obama said.

The devil however lies in the detail. It is now up to officials to operationalise the stalled nuclear deal as soon as possible so that the new found momentum in the Indo-US relations is sustained.

That Obama became the first US President to attend India's Republic Day and smaller breakthroughs

were also achieved in defence cooperation, was the icing on the cake. But initiating co-development and co-production of four small defence projects is only a beginning. If India hopes to become an effective military power, it needs a stronger military-industrial base within the country.

According to a ministry of Defence (MoD) estimate, India is likely to spend nearly US\$ 130 billion in buying arms and equipment over the next five to seven years. That makes on an average US\$ 20 to 25 billion a year to be spent on capital acquisition alone, a mammoth figure by any standard.

The distressing fact however is this: Almost 90 per cent of this money is likely to be pocketed by foreign defence manufacturers since India's defence industrial base has remained anaemic thanks to a mix of faulty procurement policies of the government and the tendency to protect defence public sector units (DPSUs), relics from India's socialist past, from competition.

But how does one change the current trend? Does India have the defence industrial base to make the paradigm shift? Can India ever become self-reliant in its defence needs? These questions have no clear or easy answers but perhaps India's defence sector can both become self-reliant and self-sufficient if it can align with the Narendra Modi government's new initiative, 'Make in India' in the coming decade.

A fairly robust, but relatively simpler technological defence production capability was inherited by the Indian state post-independence, with nearly half of the British India revenues being spent on defence production pre-independence. However, post-independence, the threat perceptions dramatically altered the defence preparedness and suddenly the country saw itself inadequate in meeting the defence needs indigenously. The sophistication of weapons increased exponentially due to advent of mushrooming industrialisation post WW2.

Having understood the mismatch including the need for capital, FDI upto 26 per cent was allowed in the year 2001 and a broader defence procurement policy announced in 2002. A defence offsetting policy in 2006, a Long Term Integrated Perspective Plan (LTIPP) announced in 2009 and a defence production policy in 2011. With the announcements of several committees being set up since 2000, it has made little headway on the ground in the actualisation of defence needs.


A term approach is of course needed because it means equipping the armed forces with a whole range of arms and platforms which may come from foreign or domestic sources. But if the objective is more than just minimising imports, then it is a positive concept of promoting and enabling the national research, development and manufacturing sectors to fulfil their strategic mandate which states that the nation of India's size, resources and potential does not have to look elsewhere for major weapons and defence systems for want of technical capabilities.

Since May 2014, the Modi government has taken at least three measures that have a direct bearing on defence manufacturing in the country. A list of defence items requiring industrial license was notified in June 2014; a security manual for licensed defence industries was also notified the same month and two months later the Foreign Direct Investment (FDI) limit for the defence sector was increased to 49 per cent with a provision that even higher FDI could be permitted if it provided access to state-of-the-art technology.

Six months on, it is not clear if these steps have helped attract any proposals. While the 'Make in India' concept is an echo of MoD's long-cherished aspiration for self-reliance in defence production, the defence ministry has failed to follow its own guidelines articulated in the Defence Production Policy (DPP) of January 2011. One of the provisions in that policy says the Raksha Mantri will hold an annual review of the progress made during the year in self-reliance. We do not however know in public domain if such a review was ever carried out.

A review of the needs of the armed forces, categorising them into urgent, immediate and necessary could be a start. The next step should be to begin consultations far and wide. In fact the 'Make in India' mantra also seeks attitudinal change to India's policy making processes – namely, fostering a culture of trust between government and industry / business stakeholders. It may therefore be a good idea to dovetail the DPP into 'Make in India' by initiating a culture of dialogue and consultations into the defence acquisition process itself. If handled properly, this dialogue could go a long way in building enhanced confidence and trust in MoD's procurement systems.

The DPP needs to reflect the political thrust towards enhancing domestic procurement and boosting purchase of equipment from indigenously designed and developed sources. A sound defence industrial base still seems to be a distant reality. A few large defence industrial houses may have been benefitted from the efforts many suggestions need further clarification.

Against this backdrop, Aero India 2015 starting on 18 February is being watched with keen interest. Prime Minister Modi is likely to open what has become Asia's largest Defence and Aerospace exhibition, raising the profile of the event that is held every two years. **Defence and Security Alert (DSA)** will bring a comprehensive report in its next edition on what transpires at the Aero India 2015. Till then, please suggest practical ways to turn this golden opportunity for the country into an implementable plan. eMail us at [info@dsalert.org](mailto:info@dsalert.org) 



**NITIN A GOKHALE**

The writer is a veteran journalist, author and media trainer specialising in security and strategic affairs.

He is the Executive Editor of **DSA** magazine.





## JOINTMANSHIP IN ACQUISITION

Defence Technology Commission should consist of DRDO scientists and those from CSIR, ISRO, Atomic Energy, NAL and renowned Professors from IIT along with Service officers representing both the users and technical experts. The DTC would identify the technologies which should be taken up for making in India under Buy or Buy and Make Indian category.

**T**he existing regulations have provision for joint procurement and acquisition. Wherever commonality of equipment exists amongst two or three Services and standardisation of Qualitative Requirements is merited, the HQ Integrated Defence Staff becomes responsible for formulating Joint Services Qualitative Requirements (JSQRs). The Joint Staff Equipment Policy Committee (JSEPC) is headed by the Deputy Chief of IDS (three-Star Officer) and consists of representatives of three Services, DRDO, all departments of MoD ie Defence Production, Acquisition, Defence Finance, Scientific Adviser to CISC, Integrated Financial Adviser to CISC etc. The QRs should be prescribed in clear-cut terms and they are not to be vague or ambiguous. They should clearly specify whether it would meet the needs of the Services for which the procurement is being initiated. The need of equipment must emerge from LTIPP (Long-Term Integrated Perspective Plan) and be clearly part of the five-Year Plan and Annual Acquisition Plans. The JSEPC is to assess that JSQR would result in multi-vendor situation. If a single vendor situation is likely, then the reasons for formulation of such JSQRs need to be recorded. Such cases need to be debated in SCAPCHC (Services Capital Acquisition Procurement Categorisation Committee) meeting (Chaired by CISC and attended by three Vice Chiefs

and officers of the rank of Addl Secretary in various departments of the MoD) while seeking Acceptance of Necessity (AON) and approved by Defence Acquisition Council (DAC) or Defence Procurement Board (DPB), this procedure has been in vogue since DPP 2006.

### Common / Dissimilar Equipment

The three Services operate in different mediums of warfare ie land, air and sea. The platforms are very different and few similarities emerge. However, some commonality in equipment fit and some platforms do exist. For example, the electronic equipment, electronic warfare software, radio equipment, small arms, ammunitions, special forces equipment, some personnel equipment etc albeit with some small modifications to suit a platform constraints (technology being similar). A ship, a tank and an aircraft have different shapes and sizes. This will dictate the space available for fitment of an equipment which possibly is being used for similar function. If the JSEPC comes to conclusion that with minor modifications the equipment would meet the needs of all three Services, it could become part of JSQR. Even some weapon systems such as surface-to-air missiles could fall in this category. The *Akash* missile is a good example and so is *BrahMos* surface-to-surface missile which is now being modified to be carried by *Su-30 MKIs* making it an air-to-surface missile. The

shipboard systems need to be more containerised and gyro stabilised to compensate for ship's pitch and roll. Truly, an indigenously developed system is likely to have more scope for commonality and therefore JSQR. The Prime Minister's drive for 'Make in India' is significant in this direction.

### New Opportunities

Does 'Make in India' open up new vistas for jointness in procurement opportunities? The answer would be Yes. The Service headquarters need to be encouraged to explore commonalities in equipment amongst three Services in consultation with DRDO. The HQ IDS is charged with such authority. Regrettably, the HQ IDS has not been enabled to exercise those charters. The Service HQs exercise greater weight in matters of QRs and acquisition, as also their inclination to buy global category acquisition to meet urgent capability gaps which have widened over a period of time due to slow process of acquisition. The HQ IDS on its part, also prepared a Technical Perspective Capability Road map (TPCR) for the DRDO, based on the LTIPP. For the first time in 2012 the DRDO promulgated its own road map factoring the articulation of HQ IDS through TPCR. It was also suggested to the DRDO that the organisation should take up the capability developments required by three Services in the realm of next 5th to 15th year, as announced in the LTIPP ie not to concentrate on developing technologies needed for equipment which fall in the realm of 2012-2017 plan period for it would be too short a time-frame for DRDO to design and develop.

The TPCR document provides sufficient clue to IDS HQ and DRDO as to what are the commonalities in some of the equipment or platforms which could have basic similarities which can be made in India either by following Buy and Make or Make category of the DPP. In fact HQ IDS has shortlisted the equipment which could be taken up for Make category. In the present drive of Make in India one would conclude that it shall be akin to Buy (Indian) or Buy and Make (both DPSUs or private sector covered under Indian category).

### Identifiable Commonalities

Some of the possible joint efforts which can be pursued (some already being done):

- Helicopters (while basic frame and machine could be from same stable with modifications for three Services ie blade folding mechanism and highly technology intensive for Anti-Submarine Warfare equipment etc)
- The Electronic Support Measure equipment and Electronic Countermeasure equipment to suit various platforms and environment.
- Unmanned Aerial Vehicles.
- Transport aircraft *Avro* replacement by private industry, could be used for civilian use and possibly by Coast Guard.

- Small arms, for all three Services, Coast Guard, Paramilitary organisations etc.
- Ammunitions.
- Surface-to-surface missiles (possible miniature version for air-to-surface missile variant eg *BrahMos*; also *Prithvi* and *Agni* series of missiles).
- Surface-to-air missiles with some modifications for all three Services.
- Personnel clothing and NBCD protection gear.
- Vehicles for Services and Paramilitary.
- Communication equipment for joint operations.
- Cyber security and warfare tools.
- Common explosives and systems for Ballistic Missile Defence and Strategic Weapons etc.

There could be many more. A Defence Technology Commission was recommended which can be put in place. It should consist of DRDO scientists and those from CSIR, ISRO, Atomic Energy, NAL and renowned professors from IIT along with Service Officers representing both the users and technical experts. The DTC would identify the technologies which

**Some commonality in equipment fit and some platforms do exist. For example, the electronic equipment, electronic warfare software, radio equipment, small arms, ammunitions, special forces equipment, some personnel equipment etc**

should be taken up for making in India under Buy or Buy and Make Indian category. The Buy Indian categorisation calls for 30 per cent Indian content but shareholding of more than 51 per cent in the manufacturing companies. The new push to make in India not only offers more opportunities for joint manufacture but also could necessitate more DPSUs and private companies' joint ventures which would then use comprehensive manufacturing capability of state. Even if the joint venture is with a foreign entity, it would not only create new avenues for employment but also provide on-job experience and build pool of skilled workforce which can take on future manufacturing independently. Joint manufacturing and acquisition provides for better management of logistics support, maintenance and possibly core technical training. The government can consider merger and acquisition of private manufacturing infrastructures to improve upon its capacity (by offering reasonable equity to IBO). It is time for using all national assets, public or private, for nation building, both are needed to increase our chances of becoming a confident power. **DSA**



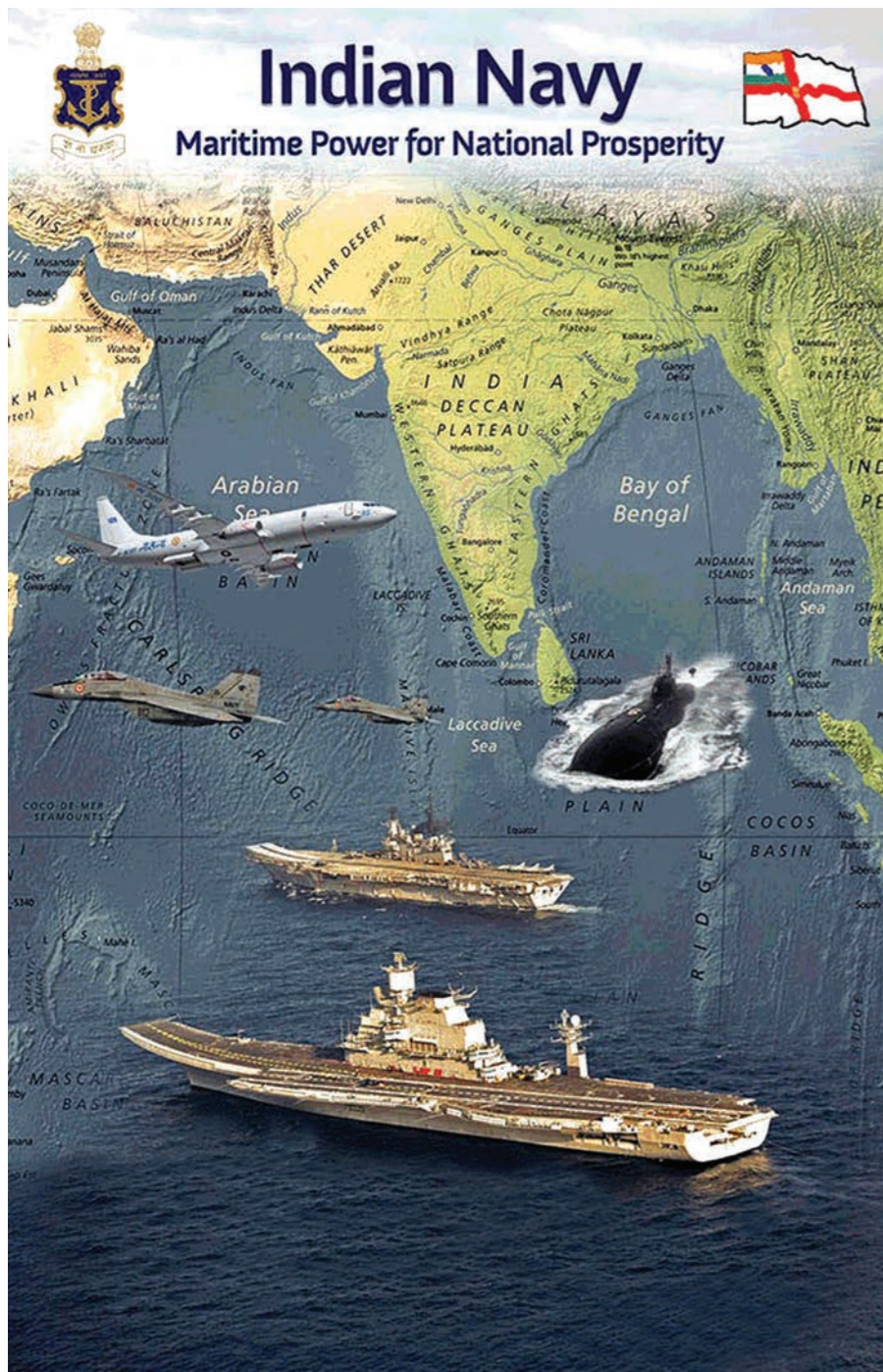
**Vice Admiral Shekhar Sinha PVSM, AVSM, NM & BAR, ADC (Retd)**

The writer is a combination of Naval Aviator and surface Warfare Officer. A Sea Harrier Pilot with approx 2,700 hrs of flying experience. He has commanded four warships and been Flag Officer Goa Area and Fleet Commander of Western Fleet. As Vice Admiral, he was Deputy Chief and the Chief of Integrated Defence Staff guiding Policy, Planning and Defence Acquisition. He retired in 2014 as Flag Officer Commanding-in-Chief Western Naval Command.



# WINGS OVER WAVES

An axiomatic imperative is that, if there is no Maritime India, you will soon see a marginalised India. The Nation, has to take a call on what needs to be done, can be done and what cannot be done for a sovereign India! Six decades plus, has seen our country blessed by unexpected miracles and plagued by unacceptable failures. Most vitally, the sea is a natural resource in creation and supplementing wealth creation. India needs to have a maritime economic vision to complement its growth and development.



Our Hon'ble Prime Minister has changed the equilibrium of internal and International India. In less than nine months there are salutary changes. In this, governance alongside, Maritime Equity of 'PURPOSE and PARTICIPATION' with 'POLICY and DIRECTION' is a critical dimension. The Indian Navy is above and beyond, the confines of a Maritime Military Entity. Its presence is a conscious recognition of India's Coastal connection, Catalytic international Maritime centrality in the context of commerce, economic growth, human development, efforts in regional, International cooperation and as a stabilising Global civilisational system! Freedom of the seas connotes maritime military working in conjunction and being complementary to free trade across the oceans. The Indian Ocean will be one of the principal central oceans, critical to global free trade bridging the East, the Middle and the West.

This article is on Naval Aviation as an integral part of India's three dimensional Navy of surface, subsurface and air, elements. In effect its purport is to showcase the inherent, intricate and essential linkages of a balanced sea going force.

**TOUCH THE SEA and SKY**  
*"To that sublime reach, I seek to fly  
 Where the horizon meets the 'Sea and Sky'  
 On the seas, lie all of India's hopes  
 In the learning of three dimensional ropes."*

**An "Air" Day At Sea**  
 Somewhere in the Arabian sea, Aircraft carrier *Vikramaditya* with *MiG-29K*, *Ka-28 / Ka-31* helicopters along with a combination of large and medium destroyers with

*Sea King* (anti-submarine and anti-ship) helicopters, frigates, missile corvettes, Boeing *P-8I*, refurbished *Il-38* aircraft was engaged with the Eastern fleet in a major tactical battle which was playing the role of a Sino-Pakistan combined Naval force. The IAF and Army were also part of this massive exercise on both sides. The Air early warning *Ka-31* picked up a signal that a real Pakistan MR aircraft, presumably a *PC3 Orion* was on a snooping mission. The *MiG-29* Combat air patrol of two aircraft was directed to the contact and lo and behold, the *Orion* was surprised and forced to turn back.

*In the meantime, the Maritime Patrol aircraft had located and started shadowing the Eastern Fleet as part of the exercise.*

A *Sea King* helicopter from a *Kolkata* class destroyer on a night anti-submarine mission had a sonar contact that indicated that this was not part of the exercise and had to be a Chinese submarine, engaged in monitoring the Indian Navy in the Indian Ocean region. The Western Naval Command suspended the exercise and the focus was shifted to a full scale prosecution of this unidentified underwater contact and force it to surface or leave the area. For the next 36 hours, a combination of helicopter, fixed-wing aircraft and anti-submarine warfare ships, forced this unknown submarine to steer a course away from the exercise area and ultimately transit out well beyond.

While all this was happening a distress call was received from a passing oil tanker to evacuate a very sick seaman to a nearby medical facility. An *Alouette* search and rescue helicopter was launched from the frigate which then winched up the patient and brought him to the ships, sick bay for emergency care till he could be sent to a hospital ashore.

The exercise was soon recommenced and the *MiG-29* of the Navy and the *Sukhoi-30s* were engaged in mock combat and air-to-air refuelling missions.

### Where The Sea Meets The Sky

Indian Naval Aviation is woven into the aspirations of the Indian Navy in response to the emerging realities in the Indian Ocean Region and the littoral areas. Some of the geopolitical, trade, commerce and allied developments that need consideration are:

- Keeping sea lanes open to ensure optimal flow of trade in both war and peace. Providing Moving exclusion zones at sea to protect non-combatants and combatants.
- To guard all coastal Vital Assets, Areas.
- PLANavy's aircraft carrier programme, investments in maritime assets and its proactive emergence on the Indian Ocean region including it's long and large term string of pearls strategy.
- Search and Rescue, Disaster Management, Pollution monitoring and contraband control

in coordination with other maritime entities.

- Counter Terrorism, Piracy and Low Intensity Maritime Operations.
- Regular Maritime aerial reconnaissance, monitoring of Merchant vessel traffic, EEZ patrols coordinated with the Coast Guard.
- Natural Calamities and fishermen protection.
- Instability in Pakistan, the Afghanistan implosion, the Taliban thrusts.
- Growing asymmetric technology capabilities of terrorist groups in land and sea.
- Absence of a cohesive, coordinated Maritime Governance, compounded by a lack of effective Maritime Domain Awareness within India's Nation Management apparatus.
- Emergence of Information Warfare as a potent weapons alternative in the field of key technologies of C<sup>4</sup>ISR and Precision Targeting.

### Fleet Air Arm

Operational 'Roles and Missions' are surveillance, identification, 'precision engagement' of 'Hostile Surface, Air, Submarine and Special Operations' targets at sea both in the crowded littoral as well as wide ocean areas, which contain friendly, hostile and neutral elements. Our forces, in this process, must be able to provide the means for positive combat identification in addition to the precision engagement called for, so that mission effectiveness is maximised and own casualty

minimised. The Fleet Air Arm reinforces the cutting edge of Naval Operations. In effect Navy Air operations consists of:

- Fighter Operations for interdiction of enemy ships / ports. Counter air operations against hostile aircraft through maintaining Air superiority with its *MiG-29 / Sea Harriers* in cooperation with *Su-30* and *Jaguar* of the IAF.
- Maritime Reconnaissance and anti-ship / submarine missions for search of hostile ships and submarines termed as distant operations away from own forces using MR aircraft like the Modern Boeing *P-8I*, the modernised *Il-38*, the vintage *Tu-142* and the short range India Navy *Dornier*.
- The indigenous ALH Naval version would replace the *Alouette* helicopter for Search and Rescue Operations. The vintage *Sea King* helicopters would be upgraded along with the likely induction of very versatile *Seahawk S-70B* multi-role helicopter, that would boost Indian Navy's integral air combat capability, Similarly the *Kamov-28*, ASW helicopter is also expected to get an upgrade.



**Vice Admiral Barry Bharathan (Retd)**

The writer is former Vice Chief of Naval Staff. He also served as Indian Naval Attache in Washington DC, USA.

**Air superiority is an integral element of the Navy. Besides the IN, joint operations with the IAF to augment, sustain this needs continuous priority attention**





### Unmanned Aerial Surveillance

UAVs are the Navy's eyes and ears that are able to give advanced situational awareness to the Navy Command and control system, both in war and operations.

### Air Superiority At Sea

Air superiority is an integral element of the Navy. Besides the IN, joint operations with the IAF to augment, sustain this needs continuous priority attention. Apart from the upgradation of the *Sea Harriers* and the development of the LCA / *Tejas*, the Indian Navy through the acquisition of the *MiG-29K*, has definitely taken a strident step optimising its operational combat capabilities in the air dimension. The fleet air arm would serve as a veritable sword arm of the Indian Navy for:

**Maritime Conflict And Low Intensity Maritime Operations.** *MiG-29K*, Boeing *P-8I*, *Il-38*, *Sea King*, *Ka-28* and the *Seahawk* multi-role helicopters are potent weapon platforms that can play a decisive role in a maritime conflict or even in an asymmetry low intensity maritime operations including piracy and counter terrorist missions.

**Protection Of SLOCs / Mercantile Marine.** The Indian seaborne trade would as much come under threat in the event of conflict. Indian Navy would perhaps deploy Escorts supported by its integral air and distant aviation support from Navy MR and IAF support.

**Strategy Of Commodity Denial.** India may adopt a strategy of commodity denial *vis-a-vis* China in the IOR in the event of a conflict. India could resort to interdiction of Chinese shipping, specifically high value targets through its carrier borne combat aircraft and helicopters.

**Maritime Conflict Scenarios.** Whatever be the trigger, in an eventuality of a conflict involving India, China and Pakistan, the following are the likely scenarios unfolding in the maritime domain:

- India and Pakistan go to war over Kashmir or a terrorist attack emanating from Pakistan and China

decides to provide overt or covert support. In such a scenario, an element of the Chinese Navy would arrive in the Indian Ocean to protect its trade and / or provide support to the Pakistani Navy.

- China plans a swift incursion into India to seize Arunachal Pradesh and its Navy enters the Indian Ocean, once again to protect its trade or keep safe its SLOCs. It would also involve in a limited trade warfare targeting Indian mercantile. The Pakistani naval force and / or ports are used to supplement the effort.

What can be seen here is that the maritime engagement would play out in three distinct areas, firstly in the Western Indian Ocean including the Arabian Sea, Persian Gulf and the Straits of Hormuz, next the North East IOR including the Bay of Bengal and the Andaman Sea and the Malacca, Sunda and Lombok Straits and thirdly in the South China Sea. India needs to be prepared on all fronts. A few nations lie on the arc of this engagement zone and how they respond to this crisis would also

have a major say in determining the outcome of this conflict. Engaging them diplomatically and wherever possible militarily is the key which India and China are both vying to achieve. Some of these nations are conglomered in an association known as ASEAN and it is important to gaze through the relations which India and China share with ASEAN before we launch on the maritime options of either country in an event of a conflict.

### India's Maritime Wake

India is in a position to chart its present and future destiny centred on a steady and strong Maritime Wake. Favourable, diplomatic, geopolitical and economic equity, growing maritime awareness in International cooperation and recognition of India's salutary benign role need to be properly internalised and then externalised in Vision, Strategy, Policy, Plan, Process, Intentions and Actions.

There has to be a consensus on balanced maritime military robustness, a concept of unified operations involving all seagoing stakeholders including the Air Force and Army.

The Prime Minister has begun well with vision, focus and proactive, supervisory direction. He is certainly messianic along with being pragmatic. The litmus test lies in the creation of Systems-Processes. India, now has leadership and management hope, promise that Creation of wealth lies in maximising our maritime options. There has to be a spirit of mutual cooperation for commerce and also sustaining the Indian Ocean as a unifying Common. Indians only need to understand that Sea-power is a combination of geo-economic and military maritime strength. The former is essential for the sustenance of the Nation while the latter is critical for the sustenance of the former. This is what Maritime India is all about. This is not a pipe dream but an essentiality that is within our reach, capability with far reaching positive impact. In the Ultimate it means never a 'Marginalised India.'

*Jai Hind! Shan No Varunah.* DSA

# THE LEGENDARY WARRIOR (RUDRA)

## युगजयी योद्धा (रुद्र)



Hindustan Aeronautics Limited

हिन्दुस्तान एरोनाटिक्स लिमिटेड

Visit / देखें : [www.hal-india.com](http://www.hal-india.com)





## EVOLUTION OF AIR WING ITS ROLE, CHALLENGES AND SUPPORT TO BSF

Given that there were no operational advanced landing grounds till Nyoma was commissioned in the Ladakh sector last year the shift of accent on the air bridge from fixed-wing to rotary-wing platforms appears to make sense in that helicopters can land on makeshift pads where required at heights close to 18,000 ft. Helicopters can cross the Himalayan hump and deliver supplies to forward Indo-Tibetan Border Police outposts facing the Chinese.

There appears to be a connection between the Chinese deep penetration raids into Chumar and Depsang in the Ladakh Sector of the Line of Actual Control in the west and aggressive patrolling in Arunachal Pradesh in the northeast in recent times and the failure to replace aircraft and helicopters intended to maintain lines of communication and logistics to Central Armed Police Forces posted on the forward edge of battle area in these sectors. India has not been able to maintain sufficient troops on the claimline because of failure to replace the air bridges that supply the essential requirements for survival and operations in areas where no roadheads exist. The induction of helicopters could improve flexibility of deployment and transfer of troops from one sector to another at short notice.

### Beginning With One

The Air Wing of the Border Security Force was created in 1969 with one Queen Air fixed-wing aircraft for transportation of the Director General on inspection duty along the 2,917 km of border with Pakistan

in the west and the 4,053 km border with former East Pakistan (now Bangladesh) which came under his jurisdiction. Over the years with the creation of more paramilitary forces (generically described as Central Armed Police Forces), under the Ministry of Home Affairs to conduct manpower intensive counter-insurgency, internal security duties and anti-Maoist operations the BSF Air Wing was assigned the task of providing the airborne logistics. The failure to replace the obsolescent Avro HS-748 transport aircraft and helicopters destroyed in crashes had depleted India's capabilities to maintain and service the needs of the Indo-Tibetan Border Police, raised to deal with the Chinese along a 4,057 km salient stretching from the Karakoram Pass in Jammu and Kashmir's Ladakh division to the trijunction between India, China and Myanmar (Burma) in Arunachal Pradesh in the east.

### Sporadic Growth

The evolution of the BSF Air Wing was commensurate with the growth of the perceived threats, both external and internal till the turn of the millennium

when sanction was given for the purchase of two medium and one large transport aircraft to replace the ageing HS-748s. It has not happened so far. In fact the accent appears to have shifted away from fixed-wing aircraft for Himalayan airlift operations with clearance for induction of eight indigenous Dhruv advanced light helicopters and an equal number of Mi-17 latest variants.

Given that there were no operational advanced landing grounds till Nyoma was commissioned in the Ladakh sector last year the shift of accent on the air bridge from fixed-wing to rotary-wing platforms appears to make sense in that helicopters can land on makeshift pads where required at heights close to 18,000 ft. Helicopters can cross the Himalayan hump and deliver supplies to forward Indo-Tibetan Border Police outposts facing the Chinese. This process of induction of helicopters began in 2008 and is expected to be completed this year. Both varieties of helicopters – the indigenous Dhruv and the Russian Mi-17V5 – are amenable to conversion to the flying artillery role using bombs, rockets and missiles. The Russian platform is capable of carrying a payload of up to 4,000 kg including 30 fully armed soldiers or 12 stretchers in military operations and cargo inclusive of mutton-on-the-hoof and live chickens internally and 5,000 kg externally slung. The latter could include the 105 mm light Indian Field Gun or the ultralight 155 mm howitzer which India intends to import thereby improving the firepower available to troops in the forward areas. The ITBP has two-thirds border outposts in such remote areas in NE and J&K that they can only be supported by air. An improvement in the number of air bridges can go a long way to improve India's ability to defend territorial integrity and prevent the kind of deep inroads that have occurred in Chumar and Depsang.

### Larger Responsibilities

Since it was raised the role of the BSF Air Wing was extended to the internal security duties involving movement of troops, VIPs and carrying out special missions. The Ministry of Home Affairs has raised seven Central Armed Police Forces (CAPFs) namely the Assam Rifles (AR), Border Security Force (BSF), Central Industrial Security Force (CISF), Central Reserve Police Force (CRPF), Indo-Tibetan Border Police Force (ITBP), National Security Guard (NSG) and the Sashastra Seema Bal (SSB). The Assam Rifles has a dual role of guarding the border in the northeast as well as maintaining the internal security by tackling the extremist organisations in the northeast region. BSF has a border guarding role on the Indo-Pak and Indo-Bangladesh borders and has also been deployed to combat the left-wing extremists. CISF provides security cover to PSUs, airports as well as noted private industrial establishments. CRPF has a diverse range of roles covering law and order, counter-insurgency,

anti-militancy and anti-terrorism operations. It assists the states in maintaining public order and in countering subversive activities of militants and left wing extremists through the use of Rapid Action Force (RAF) and the Commando Battalions for Resolute Action (CoBRA).

The NSG is a task oriented force which is used for counter-terrorist operations, counter hijacking, sky marshalling and VIP security. Its requirement of immediate transportation facilities was best illustrated during its deployment to deal with the Pakistani terrorists during Mumbai attack. The SSB is deployed on the Indo-Nepal and Indo-Bhutan borders. Its relevance became obvious when Bhutan decided to rid itself of Indian insurgent groups operating out of sanctuaries in south Bhutan about a decade ago. More recently the hot pursuit of Bodo insurgents after the massacre in Assam highlighted the need for such forces *in situ*.

The CAPFs therefore have a vital role in safeguarding the internal environment of the country from disruptive activities that can potentially lead to disorder, loss of citizens' lives and destruction of public and private property. The CAPFs have been upgraded to meet the challenges that have cropped up and have been modernised with state-of-the-art weaponry, communication and surveillance equipment and improved transport facilities including facilities for air support.

The air support requirements of the troops are in terms of resources and movement of personnel posted on the border under very hostile environmental conditions; medical-evacuation, surveillance and movement of troops for counter-insurgency (CI) operations; transportation of VIPs; air courier service for moving jawans to the nearest railhead and air support for rescue and rehabilitation of the affected after disasters. Air bridges enhance the effectiveness of security personnel guarding the borders, engaged in counter-insurgency operations, anti-Naxalite operations. It is also being used to enable the quick mobilisation of the National Disaster Relief Force personnel to disaster hit areas for relief and rescue operations and also help in the rehabilitation efforts.

The BSF Air Wing has been assigned the following roles:

- To transport essential operational loads such as arms, ammunition, ECC clothing, medicines, communication material, food articles and all other logistic items, required for effective functioning of the troops in border areas and in insurgency prone areas.
- To move personnel of all ranks of CAPFs to remote / advance field areas and to HQs for deployment in operational duties and during emergencies.
- To provide air travel facilities to VIPs / VVIPs,

**The induction of helicopters could improve flexibility of deployment and transfer of troops from one sector to another at short notice**



Central / State Ministers, Ministry officials, visiting foreign delegates, inquiry commissions, advisory boards, security liaison teams, medical teams during natural calamities etc.

- To conduct aerial survey of the areas affected by floods, earthquakes etc and to provide aerial dropping of food and medicines in such areas.
- Evacuation of casualties to the nearest base hospitals and transportation of dead bodies to various designated places.
- To transport criminals / terrorists from one place to another as per the instructions of higher authorities.
- To facilitate border surveillance and maintenance of border outposts.

The following chart illustrates the evolution of the BSF Air Wing through year wise induction of aircraft and helicopters. The lone *Embraer-135* fixed wing aircraft was acquired for VIP transportation from Brazil in 2005. The replacement for the *HS-748* transporter is contemplated through a public-private-foreign collaboration:

S/N	YEAR OF INDUCTION	TYPE OF AIRCRAFT / HELICOPTER & NOs	TO REPLACE EXISTING AIRCRAFT IF ANY
01	1968	Queen Air C-80 - 01	New Inventory
02	1972	Dakota - 01	New Inventory
03	1974	Dakota - 04	New Inventory
04	1982	SKA B-200 (VT-EHK) - 01	Queen Air C-80 - 01
05	1982	HS-748 (VT-EHL) - 01	Dakota - 01
06	1984	HS-748 (VT-EIR) - 01	Dakota - 01
07	1987	SKA B-200 (VT-EOA) - 01	New Inventory
08	1991	HS-748 (VT-EAT), (VT-EAV), (VT-DXH) - 03	Dakota - 03
09	1994	SKA B-200 (VT-BSA) - 01	SKA B-200 (VT-EOA) - 01 crashed in 1992
10	2003	Mi-17 Helicopter - 04	Under J&K Action Plan
11	2003	Mi-17 Helicopter - 01	HS-748 (VT-EIR) - 01
12	2003	Mi-17 Helicopter - 01	HS-748 (VT-DXH) - 01
13	2005	EMBRAER 135 - 01	SKA B-200 (VT-EHK) - 01
14	2003	Medium Transport <sup>2</sup> - 02	HS-748 - 02
15	2003	Large Transport <sup>2</sup> - 01	HS-748 - 01
16	2015	Mi-17 V5 - 08	New Inventory

Note\*\*: 1. Two Medium Transport and One Large Transport aircraft sanctioned in year 2001 as replacement of three HS-748 Avro aircraft not yet inducted.

The growth of manpower resources for deployment across the spectrum of conflict be it external or internal can be said to be still a 'work in progress' with the raising of more Central Armed Police Force battalions for counter-insurgency duties simultaneously with the raising of a Mountain Strike Corps for deployment against China in the Himalayas. It will have to be bolstered with adequate transportation facilities with an appropriate balance between the fixed-wing and the helicopters. **DSA**

# BOEING C-17 AND P-8I ALWAYS MISSION READY FOR INDIA

2014 has been a very successful year for Boeing Defense, Space & Security (BDS) in India. 2015 is about partnerships and strengthening Boeing's footprint in the Indian defence sector.

Boeing has established the building blocks for a long-term presence in India. We are beginning to see those early efforts bear results - our customers have received their military aircraft on schedule and are already deploying them on missions. Our commitment to supporting the fleet of the Indian Air Force (IAF) and Indian Navy has resulted in high mission capable rates for the *C-17 Globemaster III* airlifter and *P-8I* maritime surveillance and anti-submarine warfare aircraft - enabling the fleet to be mission ready for military, surveillance and humanitarian relief missions.

Presently, the Indian Air Force has 10 *C-17 Globemaster III* strategic airlifter aircraft which Boeing delivered on schedule in 2013 and 2014. With the 10 deliveries, Boeing has met its commitment of completing the contract signed in June 2011, making India the largest international operator of the *C-17*. Boeing has also delivered six *P-8I* maritime surveillance and anti-submarine aircraft to the Indian Navy in 2013 and 2014, with two aircraft scheduled to be delivered this year.

The Indian Air Force's *C-17* aircraft and the Indian Navy's *P-8I* aircraft have demonstrated an excellent record in supporting the missions they have been deployed for and our customers have expressed satisfaction about the operational readiness of both aircraft.

Both aircraft were at the forefront of rescue and humanitarian aid efforts in the natural disasters that affected Bihar, Jammu and Kashmir and Odisha states. The *C-17* was deployed to evacuate people and deliver relief supplies. The *P-8I* has been used extensively in maritime reconnaissance missions by the Indian Navy, including performing aerial reconnaissance and gathering data for planning relief efforts during Cyclone Hudhud.

There were many sombre, yet proud moments to see aircraft made by Boeing being used to reunite thousands of people with their loved ones and responding to those most affected by the devastation.

This has been possible due to the enhanced capabilities that Boeing's advanced military platforms provide and the focus on providing timely and affordable services and support. We will continue to have discussions with



Dennis D Swanson, Vice President, India Boeing Defense, Space & Security

our customers on their requirements and ramp up our support and training capabilities.

In the future, Boeing will continue to ensure that we deliver on commitments to our Indian customers and partner with the Indian armed forces to achieve their modernisation and mission-readiness objectives. In addition, Boeing will also strengthen its partnerships with Indian suppliers to help meet the Indian government's objectives to strengthen indigenous aerospace and defence capabilities and position Indian industry for growth in the domestic and global markets.

Boeing values the productivity opportunities that Indian partners can bring and is collaborating with companies such as the Tata Group, Hindustan Aeronautics Ltd (HAL), Dynamatic Technologies, Bharat Electronics Ltd (BEL), Rossell Techsys and others. These industrial partners and suppliers are already delivering world-class quality, as they become an important part of the company's worldwide supply-chain for some of the most advanced aircraft in the world. **DSA**





# Industry Monitor



## Kalyani defence manufacturing in Gujarat

The Kalyani Group plans to invest ₹ 600 crore in a defence manufacturing facility at Dholera in Gujarat. It is likely to employ about 2,500 people and will include the capacity to upgrade and overhaul armoured vehicles with a plan to also manufacture defence electronics and radars. Kalyani Group has already formed 'Make in India' project team with a number of senior executives to work on an important substitution strategy. The Group is targeting US\$ 30-40 billion worth of iron and steel products that are currently imported for the defence, energy, automotive, construction and mining equipment industries. The Group will be doing its defence business through a subsidiary Kalyani Strategic Systems.



## IAF to get more A-50 AWACS

The Beriev Aircraft Company has confirmed that government of India proposes to procure three more Beriev A-50 *EI*AWACS for Indian Air Force to supplement and bolster the operations of No 50 Squadron.



## Raven UAVs to be made in India



India and the US are set to announce joint production of next-generation *Raven* UAVs in Bengaluru. The all-weather, all-terrain battery operated *Raven* is deployed to make battlefield more 'transparent' and to target enemy armour columns and personnel. The joint production company plans to extend the range of *Raven* to 18 km and flying endurance to 6 hours from the existing 4 hours.

## Force Motors forays into defence

Force Motors Limited, a commercial and passenger vehicles major is actively looking at tapping the huge potential that the burgeoning Indian defence sector offers, according to its President (Sales and Marketing) Ashutosh Khosla. Force Motors is already supplying paramilitary ambulances to the armed forces since last year and have the capabilities to customise their vehicles for troops movement and other military deployments.



## LCA Navy tested successfully

In a big boost to India's defence capabilities specially those of the Indian Navy, Light Combat Aircraft (LCA) prototype 1 was successfully tested from a Shore Based Test Facility in Goa. LCA Navy is an indigenously designed and developed 4th plus generation combat aircraft. It is designed with stronger landing gears to absorb forces exerted by the ski jump ramp during take-off, to be airborne within 200 meters as against 1,000 meters required for normal runways.



ThyssenKrupp

## ThyssenKrupp to enter defence and aerospace

ThyssenKrupp India is looking to expand its business in new segments such as aerospace, defence and smart cities. The company will bid for multi-billion dollar aerospace and defence contracts and lend technology to its Indian partners to build submarines and smart cities. Michael Thiemann, Chief Executive Officer said his company was open to tying up with private Indian companies such as Larsen & Toubro Limited for Indian projects.

## India invites Russia for 'Make in India'

India has invited Russia to take advantage of 'Make in India' initiative in defence manufacturing. In a meeting between Russia's defence minister Sergei Shoigu and Indian Defence Minister Manohar Parrikar, the two countries also decided to hold regular review of ongoing projects. The two defence ministers also resolved to carry forward the understanding reached during the summit meeting between the Indian Prime Minister Narendra Modi and Russian President Vladimir Putin to further strengthen the special and privileged strategic partnership between the two countries. The two ministers also discussed the possibility of many more areas of cooperation in high technology defence platforms as well as armament for the Indian Army, Air Force and Navy.



## Tata, Mahindra SUVs for Indian Army



Tata Motors and Mahindra and Mahindra (M&M) are awaiting the announcement by Indian Army on the purchase of new SUVs. The Indian Army is going to choose between Tata Safari Storme and the Mahindra Scorpio. Initially the Army is likely to buy almost 5,000 vehicles for about ₹ 500 crore. Over a period of 10 years, the total intake would be 30,000 SUVs worth ₹ 3,000 crore. The modified version of the SUVs offered to the Army is expected to be quite different from what is available for civilian consumers.







# AVIATION SECURITY A COMPLEX CHALLENGE

Concern for aircraft security is double edged weapon because any act or imprudent decision by anybody could endanger lives of people and country's prestige. Multi-layers and various double-checks with the help of technology and dog squads may help reduce the threat to security, even in the case of human errors that are likely to occur in the process of performing duties due to pressure of work. It is imperative that even the smallest of threats must be taken very seriously and no compromises should be accepted in airports' security.



**A**viation sector has been threatened by terrorism for decades and still the threat has remained constant in view of its vulnerability, high value targets and impact around the world. Over the past several decades, aviation sector has been attacked by a number of individuals, different groups for various reasons and causes. Terrorists' ongoing research efforts to defeat security further pose more concern and challenges to all organisations providing security to aviation sector. However, India along with many other countries has increased aviation security measures to prevent and deter attacks.

The aviation industry in India is one of the fastest growing sectors. This sector has undergone rapid transformation after adoption of open sky policy under which operators are permitted to operate flight from any airport. By 1995, several private airlines had entered and dominated the aviation sector. Indian aviation has been witnessing traffic boom continuously and registered a record growth.

Presently Airports Authority of India is managing a total of 125 airports including, 81 domestic airports, 11 international airports and 25 civil enclaves in Defence compounds.

### High Value Targets

The security of the aviation industry across the world is very sensitive and it is potential target for terrorism because it is a lifeblood of global trade and having multidimensional effect on society. The first recorded hijacking of aircraft was on February 21, 1931 in Peru by armed Peruvian revolutionaries who wanted to take aircraft to Lima so that they could drop their propaganda leaflets. The history of hijacking in India may be traced in the year 1964 when Royal Nepal Airlines plane was hijacked from Kathmandu to Forbesganj (Bihar). The first incident of hijacking occurred in India on 30th January 1971 when Indian Airlines aircraft was hijacked by Kashmir National Front bound from Srinagar to Delhi via Jammu.

Hijacking of an aircraft should be considered as potential threat because it gives opportunity to hijackers to reach any desired airport in the world within short time. It provides great security to hijackers because of suicidal target for rescue operations. No shoot-outs take place in mid-air and most of the casualties have taken place so far on the ground only. Added advantage is that doors of the aircraft cannot be easily opened so none can enter or leave without the notice of hijackers and command and control is easy over the hostages. One hand grenade or burst fire could incapacitate a dozen persons due to high concentration within an enclosed place.

### High Point Of Hijackings

The aviation security is a highly dynamic and complex process which involves a lot of strategies and coordination. Between 1945-52, hijacking was used mainly as a means of escape for refugees from Stalin's Eastern Europe. During this period hijacking was committed for personal or private objectives only and used by fugitive, military deserter, political refugee or mentally sick person. The Popular Front for the liberation of Palestine initiated the use of hijacking for political purpose with the diversion of an Israel aircraft to Algeria in 1968. After that it was followed by 16 attempts of hijacking by the same organisation in the next four and an half years. From 1968 onwards hijacking evolved with the help of weapons and provided a platform for extremist groups to propagate political cause, collection of ransom, release of sympathisers from jail. The year 1968 is described as the year of 'Aviation Terrorism' because 38 attempts were made, out of which 33 were successfully hijacked. The first instance of storming the hijacked airlines was done by Israel in 1972 when Palestinians hijacked aircraft of Sabena Airlines at Brussels and brought it to Tel Aviv for bargaining the release of Arab prisoners. But the use of hijacked planes for the suicide attack on America on September 11, 2001 changed the way hijacking was perceived. However, similar aborted efforts had been done in 1974 and 1994.

### Indian Experience

As far as India is concerned, before the merger of Indian Airlines and Air India, they have been hijacked sixteen and three times, respectively. Foreign operated aircraft had been hijacked six times as well. Delhi scored six times, highest among originating stations of the hijacked aircraft followed by Srinagar, Mumbai and Lucknow two times and Chandigarh, Mangalore, Coimbatore, Kolkata, Patna once each.

Motivations for hijacks are seen mainly to obtain transportation, ransom for personal gain, attracting geopolitical attention and worldwide publicity for some cause, gain political objective, use an aircraft as suicide

missile and are also done by mentally abnormal people.

In many cases of hijacking, it has been observed that terrorists managed to approach the aircraft in the guise of police. In 1986 at Karachi Airport, four Arab men dressed as security personnel driving a vehicle similar to a security vehicle with a flashing amber light managed to drive up to the aircraft with weapons, stormed the aircraft and hijacked it. There are instances when attacks were made on lounges to kill passengers. Firing was done to target the lounge in Munich, Athens, Rome and in 1976, Istanbul. In 1969 Palestinian rebels attacked Zurich airport in Switzerland at searching and frisking point and killed police officers. In 1984 in Chennai, unattended suitcase was allowed to lie for more than two hours without raising suspicion and an explosion took place leaving 32 persons dead. Same type of blast also took place at Turkish Airlines counter in 1983 at Orly Airport, Paris.

### Airport Security

After hijacking of Indian Airlines Flight 814 in 1999, Central Industrial Security Force was asked to take over the security of the airports in India. Presently CISF is incharge of security of maximum airports in India. However, Central Reserve Police Force is manning security of sensitive airports like Srinagar, Leh, Jammu, Aizwal. In 2001 when Laskhar-e-Taiba suicide squad tried to storm Srinagar airport, it was prevented by Central Reserve Police Force (CRPF). Woman Constable Bindu Kumari laid down her life to defend Srinagar Airport. She was awarded the Police Medal for Gallantry (PMG) posthumously.

Concern for aircraft security is double edged weapon because any act or imprudent decision by anybody could endanger lives of people and country's prestige. Multi-layers and various double-checks with the help of technology and dog squads may help reduce the threat to security, even in the case of human errors that are likely to occur in the process of performing duties due to pressure of work. It is imperative that even the smallest of threats must be taken very seriously and no compromises should be accepted in airports' security.



**Cmt Sushir Kumar**

The writer is a Commandant (PRO / OPS) in The Central Reserve Police Force (CRPF). He has served in all parts of the country including militancy affected areas of J&K and Northeast. He has done Management Course in Human Resources and Psychological Counselling. He has also worked in elite security organisation Special Protection Group (SPG).

**The mere presence of VVIP may be a strong bargaining point for terrorist organisations along with wide publicity throughout the world and demoralising effect on the concerned country**

### VVIPs Vulnerable

Traffic boom and wide ranging functions in aviation industry have





- Displaying of PIC to detect misuse.
- Frisking of all PIC wearing persons.
- Issue of PIC after security vetting.
- Members of crew and other agency are not exempted from security checks.

Frisking of passengers and search of hand baggage at ladder point should be mandatory like at Srinagar. Additional ladder checks completely remove all possibility of an armed man boarding the aircraft. But, security forces manning the airport may also be involved in developing cross-observance. Presently airlines concerned are supposed to do so.

Loader should be frisked before loading the whole luggage, cross-check and observation should be maintained during loading. A bomb exploded in a suitcase being moved between flights at Leonardo da Vinci International

Airport, Rome. Besides it, so many explosions were reported in the world. Passenger / baggage reconciliation to be ensured at all airports. Various explosions took place when unidentified luggage was not taken care for.

**Networked Communications**

Effective communication system should be available at all vantage points, control room and Quick Response Team. All cargo should be placed in decompression chamber before take-off. It is mandatory in Israel where only one successful hijack has been reported. Airlines staff should be advised to hide identification of sky marshals. Pilot may be trained and may be provided small weapon to use as a last resort to retaliate.

Aircrew training may be emphasised. Even in India two attempts of hijacking were foiled by crew members. So many times crew members have shown their capability and neutralised the hijackers all over the world. Possibility of providing suitable weapons to crew may also be explored. Unobtrusive surveillance in sterile areas as well as in terminal building should be done meticulously. A bomb exploded in a flower shop in the terminal at Gondo Airport, Las Palmas and Canary Island. Vehicles should be prevented from making more than momentary stop to unload passengers and luggage.

In addition to above various measures may be taken like cockpits should be strong enough to sustain firing from small weapon, after check-in passengers should be provided a bus up to the aircraft. If bus ride is not possible, passengers should be escorted up to the aircraft under the supervision of escorts. Security of diplomatic bags, catering, fuel, postal bag and other items likely to go in vicinity of aircraft should also be sensitised. It is also need of the hour to consider a single force responsible for the airport's total security and increase the number of sky marshals and place them in maximum flights in the Indian skies. **DSA**

also increased the threat to aviation sector due to frequent use and presence of VVIPs as it is essential mode for VVIPs movements. The mere presence of VVIP may be a strong bargaining point for terrorist organisations along with wide publicity throughout the world and demoralising effect on the concerned country. All guidelines for security arrangements for protection of VVIPs should be ensured meticulously.

Since all the airports are linked, the lack of security precaution at one airport may enable the hijacker to gain access to aircraft. Hence security in all airports should be uniform.

The coordination among various agencies like Airports Authority of India, CISF, local police and airlines staff should be professional and strict access control measures should be ensured. Surprise checks over them by independent agency may also provide strict compliance.

**Insider Jobs**

Based on previous instances subversion may not be ruled out by crew members and airline staff. Airlines should be instructed to ensure the antecedents and conduct of crew members frequently. In 1998, official pilot hijacked Air China flight from Beijing to Kunming but he was attacked by flight engineer and co-pilot after the pilot threatened to crash the flight. In another instance Iranian flight attendant hijacked Kish air flight 707 which landed in Israel.

At many airports after baggage is x-rayed, it remains with passenger for a long-time till it is handed in at airline check-in counter. Anything can be kept in its numerous side pockets, as passengers have not been frisked till then. A system should be introduced in all airports like Delhi where after putting the baggage on airlines counter, security of baggage is ensured.

For strict access control, following should be mandatory for all staff including crew going inside the airport:

- Photo and biometric imprints on photo identity card (PIC).



www.mku.com

**SAFE, PROTECTED & SECURE**



**200+ Helicopters protected till date**

Battle proven and ready solutions for over 20+ types of helicopters including:



Sikorsky S-70/Black Hawk/UH-60/60M, Eurocopter BO-105/FENNEC, Boeing CH-47, etc.

Introducing  
**MODULARE SCHUTZ TECHNIK**

**6<sup>th</sup> GENERATION ARMOUR TECHNOLOGY**

**40% LIGHTER THINNER**

DESIGN, DEVELOPMENT MANUFACTURING, INTEGRATION

**Mission critical, light weight modular protection technology for helicopters**

MKU introduces 'Modulare Schutz Technik'. The German Engineered, revolutionary attachment systems, enable the armour kits to be easily deployed on the aircraft, without affecting the structure/aerodynamics of the platform. This unique process and technology keeps the air worthiness intact. The Patented and battle proven attachment systems allow the armour kits to be easily removed for alternate missions like rescue/transport etc requiring full payload capacity.

Complementing the 'Modulare Schutz Technik', is the 6th Generation armour protection technology developed by MKU. It uses advanced materials, and specialized manufacturing processes, to reduce the weight of armouring by over 40%, resulting in operational benefits like increased useful payload and endurance.



Trusted by more than 230 forces in over 100 countries



Registered supplier to UN and NATO

AS 9100 certified Rev C



SAVING LIVES EARNING SMILES

MKU Pvt Ltd. D-20, 1<sup>st</sup> Floor, Defence Colony, New Delhi-24. India. Tel: (+91 11) 46543512. Fax: (+91 -11) 46543514. email: protection@mku.com  
MKU GmbH, Kampweg 9, 27419 Sittensen, GERMANY. Tel: (+49-4282) 50810-0. Fax: (+49-4282) 50810-60. email: protection@mku.eu



# PLAAF EMPHASIS ON MAN BEHIND THE MACHINE

With the continuing modernisation of the force the importance given to the human element of the air arm will only go up in the future. PLAAF can be expected to review its pilot selection process at frequent intervals to help identify the best candidates. However, the emphasis on testing the political ideology of the candidates and officers can be expected to continue as still the Chinese armed forces are at the service of the party rather than the government.

When China came out of the Cultural Revolution, its armed force was in the worst shape. The People's Liberation Army Air Force (PLAAF) was the worst affected as years of pilot training were lost. The communist ideological fervour was whipped up to such an extent that even pilot training was considered as capitalistic and flight manuals were destroyed. The force was left with obsolete aircraft without sufficient spare parts and equipment to begin full-scale flying training. After the Four Modernisations began, in which defence modernisation was the fourth element, PLAAF had to first deal with equipping the force before it could focus on training the pilots for modern air combat. Actual focus on modern flight training did not begin until early 21st century. Piloting skills and experience continues to be a weak area compared to other major air forces. However, PLAAF has lately put the issue in the front burner and is fast catching up with its western and other counterparts.

## Restructuring Recruitment

Recently PLAAF made an important announcement on the sidelines of the 10th China International Aviation and Aerospace Exhibition in Zhuhai on changes in the recruitment process of pilots for PLAAF starting from 2015. Three changes were mentioned that will be implemented from 2015 onwards which aim towards improving the methodologies used in the recruitment process using modern technology for a more scientific and more accurate evaluation of candidates. In addition to change in the recruitment process, PLAAF officers mentioned the improvement in the training methods and process over the decades emphasising more on quality and efficiency over quantity.<sup>1</sup> With the continuing technology modernisation of the force, PLAAF is constantly paying attention to the core element of its fighting arm – the pilots.

## Fine Tuning

The increasing emphasis on improving the pilot selection process should not come as a surprise as it is only a natural process of a modernising force. It becomes essential with the phase of modernisation of PLAAF which is centred on the latest battle technology trend which revolves around better processing of



information. Modern warfare is all about better, faster and efficient processing of information and providing targeted information to every friendly node in the battle theatre and at the same time providing seamless independent data communication between necessary nodes. All this is done to provide better situational awareness not only to the battle commander but to every pilot (soldier), to help them take better informed decisions at the earliest for a more favourable outcome in the tactical or the larger military strategic situation. As a result the pilot in the cockpit of a modern fighter aircraft is fed with enormous amount of information which he should be able to quickly process and decide his moves in seconds as every air engagement only lasts a maximum of couple of minutes.

## Agile Mind

Compared to merry control sticks, instrument panels and gun sight of previous generation aircraft, the modern fighter cockpit is filled with digital information display panels. All the critically relevant information is flashed right in the pilot's helmet mounted display. Though the physical workload of a pilot has been reduced by way of digitised flight control systems, the flooding of data has enormously increased a modern pilot's mental workload. Hence, future fighter jocks are required to have an agile mind and rapid reflexes to quickly process the available data and take quick decisions which makes it increasingly important to lay more emphasis on recruiting the candidates with the right stuff. This is the reason the new PLAAF recruitment modification emphasises more on accurate psychological selection method.

The new enrolment procedure is reported to have three changes; improvement to two methods and a new addition. Firstly, the management and

information system for preselection will be used for the first time. This basically is the introduction of Online Application Process for selected provinces: Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Gansu, Shaanxi, Qinghai, Ningxia, Xinjiang, Shandong and Henan and the candidates can check the results with their phone numbers or using their email IDs.<sup>2</sup> This is mostly to make it more candidate friendly and ease the administrative process of the selection cycle. The second modification is in the psychological selection method where candidates will be measured individually rather than in group using the psychological-selection basic cognitive platform. The third is a new element – a simulated flight test which is a common practice of major air forces.<sup>3</sup>

## The Sukhoi Effect

The importance of selecting the best candidates for fighter training might have been realised by China after the induction of the modern *Sukhoi* fighters in the early 90s. In the early 2000s, the PLAAF progressively introduced new programmes to recruit graduates from PLA colleges and students and graduates from civilian colleges with a science and engineering background. Ever since PLAAF has been focusing on recruiting better educated candidates. At present the number of pilots with a college degree has reportedly gone up.

PLAAF, at present, has around 600 modern fighter aircraft with modern digitised cockpits and controls. In future the number of fourth and fifth generation aircraft may go up as China reportedly is in the process of purchasing the Russian *Su-35* and would also start inducting its indigenous fourth and fifth generation aircraft like the *J-10*, *J-20* and *J-31*. It would slowly phase out the older generation aircraft such as the *J-7s* and *J-8s*. As the number of modern fighters go up it would naturally increase the requirement of highly capable pilots. In addition to fighters China will also be inducting its *Y-20* heavy lift transport aircraft which in future might be modified to play the role of refuelling tanker and *AWACS*. Hence, in a few years from now the number of pilots recruited might go up considerably.

## Han-oriented

The other elements of the recruitment process as mentioned in the reports are, PLAAF continues to prefer candidates from the Han majority provinces and Han nationals and emphasis is still given to political ideology during the recruitment process as the second level of the selection process also tests the political qualities of the candidates,<sup>4</sup> which goes against the professionalism of the force. China still practices the typical communist style political commissar system

where the commissars ensure ideological compliance of the officer and other personnel assigned to him.

On the training front, PLAAF training methods have improved and have been modernised. China now has its own version of the Red Flag combat simulation exercise called the Golden Helmet which would go a long way in improving the combat capabilities of the force. With enormous amount of money being pumped in for training, the pilots would get more flying hours and experience improving their combat edge over their potential adversaries. It is reported that the number of years to train new recruits have been reduced by introducing new and efficient methods. The training procedure is moving towards more of western style from the present methods which is more of Soviet / Russian training methods. However, it is not known if such

change towards a more professional force would also lead towards abandoning the adopted Russian doctrine of strictly ensuring that the fighters operate within the Ground Control Intercept (GCI) where the fighters, particularly the ones on Close Air Patrol (CAP) and intercept missions remain within the friendly radar envelop. This is a typical communist method to prevent pilots from defecting to western liberal democratic countries.

So far PLAAF pilots were considered inferior compared to the US, Japanese, Taiwanese and Indian Air Force counterparts. With the enhancement in the training procedure and the increasing flying hours clocked by pilots, this gap would get narrowed down in the future bringing PLAAF pilots on par with other advanced air force fighter jocks.

With the continuing modernisation of the force the importance given to the human element of the air arm will only go up in the future. PLAAF can be expected to review its pilot selection process at frequent intervals to help identify the best candidates. However, the emphasis on testing the political ideology of the candidates and officers can be expected to continue as still the Chinese armed forces are at the service of the party rather than the government, which is typical of a communist state. Further preference for the ethnic Han candidates would remain over candidates belonging to the larger minority particularly from restive provinces over concerns of loyalty of the recruits to the party. **DSA**



**Arjun Subramanian P**

The writer is an engineering graduate in Electronics and Communication from Anna University, Chennai. He did his masters course in East Asian Studies, Dept of East Asian Studies, University of Delhi. Presently he is an Associate Fellow at the Centre for Air Power Studies, New Delhi.

**Preference for the ethnic Han candidates would remain over candidates belonging to the larger minority particularly from restive provinces over concerns of loyalty of the recruits to the party**

1. Chinese Air Force Pilot Training To Achieve Three Major Change, Military Worker.cn, 09 Nov 2014.

2. The Chinese Air Force Pilot Cadet Enrolment 2015 Introduces Three New Changes, AK Military Network, 17 Nov 2014.

3. [http://eng.chinamil.com.cn/news-channels/china-military-news/2014-11/15/content\\_6225350.htm](http://eng.chinamil.com.cn/news-channels/china-military-news/2014-11/15/content_6225350.htm)

4. [http://eng.chinamil.com.cn/news-channels/china-military-news/2014-11/15/content\\_6225350.htm](http://eng.chinamil.com.cn/news-channels/china-military-news/2014-11/15/content_6225350.htm)





## NEW FDI POLICY FOR DEFENCE INDUSTRY AND ITS IMPACT ON DEFENCE PROCUREMENT

Within India, it is likely the next five years will see considerable change in the dynamics of the defence industry. Historically, the industry has been dominated by DPSUs, chiefly HAL. The good news is that the results of liberalisation and proactive policy decisions by the government in the last 10 years are beginning to bear fruit. Several large private sector groups and a large number of smaller companies have entered this sector and are supplying limited parts and equipment to the armed forces, DPSUs and Tier I and Tier II foreign companies.

**T**he government of India has been progressively liberalising the foreign direct investment policy. Sectors like real estate, retail trading and atomic energy are restricted and others such as Defence manufacturing sector are subject to foreign direct investment (FDI) limit under the government approval route.

The Defence sector continued to be in the restricted category for the private industry until 2000. The government opened the Defence industry subject to Industrial license under the Industries (Development & Regulation) Act 1951 in 2001 for the Indian private industry with 100 per cent participation and with foreign direct investment at 26 per cent with the government approval. The government also introduced licensing guidelines in 2002 for production of arms and ammunition.

India is the largest buyer of Defence equipment in the world and also imports substantial part from foreign players at a considerable outflow of foreign exchange. The indigenisation in production of technology has so far been attained to a greater extent by the public sector undertakings, whereas Indian private players are still working towards

building up capabilities of design and manufacturing in the Defence sector. In reality, public and private industry in India is yet to deliver the aspiration of substantive self-sufficiency in the Defence sector. Additionally, a product development with state-of-the-art technology from Indian companies has still not reached a desirable level in India.

In May 2010, the Department of Industrial Policy and Promotion (DIPP), Ministry for Commerce and Industry, released a discussion paper on 'foreign Direct Investment in Defence Sector', which was supportive of relaxation of the FDI cap. DIPP mentioned that since it will take some time for domestic companies to acquire a technical edge, it is important to consider the vital question of accessing the technology through the modality of allowing foreign companies to set up production facilities within the country itself. Manufacturing within the country, through foreign capital, with full transfer of state-of-the-art technology is considered a better option than importing the equipment from abroad.

As an outcome of requirement of self-reliance, import substitution and indigenisation, FDI limit of 26 per cent is increased to 49 per cent under the government approval route<sup>1</sup>. The Defence industry

has now also been re-opened up for portfolio investors (foreign institutional investors, foreign portfolio investors, non-resident Indians, qualified foreign investors and foreign venture capital investors), however, FDI limit for these portfolio investors is set at 26 per cent of total equity of JV and to be part of overall limit of 49 per cent.

For FDI above 49 per cent, the application is also required to be submitted to the Cabinet Committee on Security (CCS) besides Ministry of Defence (MoD) and Foreign Investment Promotion Board (FIPB) and is evaluated on case-by-case basis, with insistence on per access to modern and state-of-the-art technology.

### Management And Control

Key conditions with respect to management and control of the applicant company, for seeking approval up to 49 per cent are listed below:

- The applicant company seeking permission for FDI up to 49 per cent should be an Indian company owned and controlled by resident Indian citizens.
- Management of the applicant company should be in Indian hands with majority representation on the Board and the Chief Executives being resident Indians.
- Certain key conditions have been removed from the FDI in Defence industry. The condition of 51 per cent equity to be held by the largest Indian shareholder has been removed. With this removal, two or more Indian companies or Indian investors can now invest in joint venture in Defence sector in India. Indian companies will now have flexibility to plan their investments.

No lock-in period for transfer of equity from one non-resident investor to another non-resident investor. This will give flexibility to portfolio investors and also foreign operating companies to exit from the ventures any time even before expiry of three years.

### Industrial Licensing

FDI limit is applicable only to those Defence items which are subject to industrial licensing. The Ministry of Commerce and Industry has recently curtailed the list of Defence items<sup>2</sup> for industrial licensing and removed certain anomalies. As a result, parts, components, assemblies used in Defence equipment no longer continue in restricted category of FDI policy. Henceforth, such items can be freely manufactured in India without FDI restriction and industrial licensing.

### Dual-use Items

The concept of dual-use goods does not exist in FDI policy and thus, no specific FDI limit is prescribed for the same. It can imply that the dual-use goods may either fall under the category of Defence manufacturing or under the residuary items

category with 100 per cent FDI allowed under the permitted policy. As an example, homeland security items which are of dual-use nature may also fall under this FDI limit. It has been observed that the position is being taken by the MoD in the past that production of dual-use goods also falls under FDI limit of 26 per cent.

Now with new list of Defence items for industrial licensing, certain dual-use goods (not forming part of the latest list of items in industrial license) will fall outside the purview of FDI limit of 49 per cent and therefore, such dual-use goods can now be produced without any approval for FDI limit and industrial licensing.

Further, no FDI limit is applicable on research and development (R&D) and services including maintenance, repair and overhaul, design and engineering.



**Nidhi Goyal**

The writer is Managing Director, Tax and Regulatory Affairs Protiviti India.

**Despite 49 per cent shareholding, the desirable technology may not be forthcoming to the Indian private sector**

### Challenges

A joint venture route in Defence production is mainly adopted to seek technology, know-how and intellectual property rights from the overseas joint venture partner. Besides economic returns, the overseas partner having limited shareholding of 49 per cent (earlier

26 per cent) would look for control in the joint venture through various means. These include limitations on the technology made available, restrictions in using the brand name or opposing any special resolution through veto power of the minority shareholder. Despite 49 per cent shareholding, the desirable technology may not be forthcoming to the Indian private sector. It is a moot point for the foreign companies to make investment and part with its technology without sufficient ownership and control over the joint venture company.

Thus, even 49 per cent FDI poses a barrier in allowing foreign companies to bring current technology in India.

Besides FDI limit, there are a number of other regulatory challenges to entry, which include offset requirements – ranging from 30 per cent to 50 per cent depending on defence procurement procedure (DPP) restrictions – industrial licensing, protection of intellectual property rights, capability of Indian joint venture partners, custom clearance required for both import and export, existing tax regime in India etc.

Similarly for Indian industry, entry into the Defence industry requires significant investment into the manufacturing supply chain and long-term commitment to R&D. Small and medium companies

1. Press Note 7 (2014 Series) dated 26th August 2014.

2. Press Note 3 (2014 Series) 26th June 2014.





that wish to enter the Defence sector face challenges that include access to loans, securing industrial licensing, gaining custom clearances, meeting quality standards, adding efficient and expert management, establishing strong supply chain management, paying the high cost of the tendering process etc. Furthermore, the current timelines for procurement which are described by the DPP as two to three years have been reported to take more than four to six years. This also makes it difficult for private companies (both Indian and foreign) to enter the market.

#### Offset Requirement

One of the modes of discharge of offset is foreign direct investment by the foreign companies in Indian joint ventures. With increase of FDI to 49 per cent, the valuation of offset shall get increased. However, it is to be noted that where 100 per cent FDI in production of items or components used in Defence industry is permitted now, any procurement of goods from such wholly owned subsidiary may not be accepted as an eligible mode of discharge of offset by the Ministry of Defence. With this, even though FDI in Defence industry is liberalised to some extent, but the due recognition of the same still needs to be given in the Defence offset guidelines which is forming part of DPP. MoD should permit application of offset guidelines on procurement of permitted Defence items manufactured from wholly owned subsidiary (WoS).

Till date total 24 offset contracts have been concluded amounting to approx US\$ 4.87 billion. These offset contracts are currently under implementation stage with the execution period of certain contracts extended till 2022<sup>3</sup>. Majority of these offset contracts are for procurement of aircraft and equipment used for aircraft. This means the foreign players who are awarded Defence contracts are required to meet offset condition and such offset requirement is met by them through procurement of goods and services from Indian public sector and private sector players.

3. Press information bureau dated Aug 1, 2014.

#### Market

The government of India has set its target to achieve higher indigenisation of the Indian aerospace and Defence industry and self-reliance in the design, development and production of equipment / weapon systems / platforms required for the armed forces. Various policy documents have been promulgated for meeting the said objectives. The National Manufacturing Policy emphasises on aerospace and Defence industries to have a strong value chain addition element from the standpoint of national security and to accelerate growth of manufacturing sector in India. The Planning Commission of India has identified the aerospace and Defence industry as a strategic sector.

Aerospace continues to be a sector where India struggles to indigenise production. India has historically sourced much of its aircraft from Russia, but is increasingly seeking to diversify the vendor base, with United States, European and Israeli firms in particular.

An overview of the different market segments starting from military to civil and general aviation demonstrates that both the global and the Indian scenario for aerospace industry are changing rapidly. Within India, it is likely the next five years will see considerable change in the dynamics of the defence industry. Historically, the industry has been dominated by DPSUs, chiefly HAL. The infrastructure to support this industry in terms of educational institutions, regulatory policies and the nature of demand was also oriented towards strengthening the public sector and was orchestrated by the government. The industry is still in a nascent stage of evolution but the good news is that the results of liberalisation and

proactive policy decisions by the government in the last 10 years are beginning to bear fruit. Several large private sector groups and a large number of smaller companies have entered this sector and are supplying limited parts and equipment to the armed forces, DPSUs and Tier I and Tier II foreign companies.

The procurement pipeline of military as well as civil aircraft is going to be enormous over the next two decades. In addition to this, there exists a large MRO market opportunity as well as potential for high value R&D in engineering outsourced services and avionics.

With increase of FDI limit, there is an expectation that the aircraft industry is going to grow fast. This is likely to be achieved by either allowing foreign companies to set up manufacturing facilities along with Indian partners or provide technology to the Indian players who would then integrate aircraft in India. 

## LEVERAGING PARTNERSHIPS AND OFFSETS TO BOOST THE INDIAN AEROSPACE SECTOR

**W**ith a new government in place, there are indications that welcome structural changes to the Defence Procurement Procedures will take place to help lay the foundation for a vibrant defence industrial base in India characterised by innovation, growth and competitiveness.

This comes at an opportune time when the dynamics of the Indian aerospace industry have changed significantly in the last decade with the entry of the private sector, both large and micro and small enterprises and by global aerospace original equipment manufacturers (OEMs) and their direct suppliers looking to procure products at competitive prices by leveraging India's low-cost manufacturing base, as well as the government's policies related to offsets and procurement that drive collaboration with Indian industry.

The key drivers expected to play a major role in shaping the Indian aerospace and defence industry include the growing market potential for defence and commercial aircraft globally which represents a tremendous opportunity for suppliers in emerging aerospace manufacturing regions like India to step in and provide greater capacity. The second driver is the government's plan to use the 'Make & Buy Indian' category of procurement to drive indigenisation which is a welcome step provided the economics of building a defence platform is taken into account. If implemented successfully and targeted for select type of purchases, this initiative can develop and grow India's defence industrial base. The third is government policies related to offsets. More than US\$ 70 billion of offset-related business is expected to flow into the Indian aerospace industry in the next decade, according to an Edelweiss report on defence from July 2014. Offsets can act as a catalyst to grow the defence industrial base through a variety of collaborations with the OEMs.

The first driver is 'supply' centric – one that may open several opportunities for India's industrial base. However, an Indian organisation's ability to convert these opportunities into revenue will depend on developing excellence in aerospace manufacturing and support from government policies. More significantly, the policies associated with partnerships (Foreign Direct Investment or FDI) and offsets will also determine the nature of India's defence industrial base in the future. To develop vibrant Aerospace Defence industrial base, partnerships (both equity and non-equity) and a pragmatic, growth-focused offset policies are needed.

The increase in the FDI limit up to 49 per cent is a step in right direction and we welcome it. However, changing the FDI limit alone will not help grow the defence industrial base. For example, the control for a minority shareholder does not change from 26 per cent to 49 per cent, which may limit the incentive or ability of OEMs to share key technologies.

While equity partnerships through joint ventures are important to have long-term sustaining partnerships, let's not forget that non-equity partnerships are just as crucial as equity partnerships, if not more, to grow the defence industrial base. Non-equity partnerships are relatively easy to initiate and considered less complex to execute. They work well when the scope of the joint activity is well defined and expected to undergo minimum change over

the course of the partnership. Boeing has invested in supplier development, training, tooling and quality systems at Indian suppliers without taking an equity stake.

Non-equity partnerships may be seen as the preferred way for foreign OEMs to engage with Indian suppliers in the absence of an FDI regime that provides complete control to the foreign OEM. Again, India's decision to liberalise FDI in defence to 49 per cent is a welcome step. We understand that on a case-by-case basis, the government may allow a higher stake if it is found to be in India's interest – for cutting edge technologies, manufacturing know-how and employment generation. Given the complex approval process for exceptions, it may be in India's interest to cross the 2 per cent barrier and allow up to a 51 per cent stake sooner than later.

A 'growth-oriented' offset policy can act as a catalyst because it encourages foreign OEMs to place more complex work with Indian companies for the value that the supply base provides. Below are five key suggestions that could help in achieving that objective.

**One,** the period of discharge of offset commitments should exceed the period of the main procurement contract beyond the current two-year maximum. Short period of performance (5-7 years) indirectly forces


the Original Equipment Manufacturers (OEMs) to place 'low-complexity, low value' work since complex, high-technology projects require significantly longer time to execute.

**Two,** give foreign OEMs the flexibility to define offset amounts for each Indian Offset Partner over the course of the programme rather than having to commit to fixed dollar / percentage amounts at the time of offset proposal submittal.

**Three,** industry should be given flexibility to make changes to the offset offerings by changing offset partners and projects during the period of performance. Inflexibility in changing offset partners encourages mentality of entitlement among Indian suppliers and hinders development of competitive supply base that is driven by global quality standards.

**Four,** tier-1 suppliers (direct suppliers to OEMs) should be allowed to discharge offset commitments on behalf of the foreign OEM for all offset contracts currently under execution and they should be permitted to discharge offset beyond the extent of their work share.

**Five,** reinstate services as eligible defence offset transactions. Putting engineering services in 'abeyance' forces only build-to-print manufacturing, discouraging end-to-end product development that includes design, prototyping and manufacturing.

In summary, significant up-side will be realised by the Indian aerospace and defence industrial base through partnerships and growth-focused offset policies. This will not only help develop a more competent industrial base but also significantly help grow manufacturing and jobs in India. 



Ankur Kanaglekar  
International Strategic Partnerships  
Boeing Defense, Space & Security





# RUMINATIONS ON DEFENCE BUDGET 2015-16

In the last year's budget, there were references to allocation for one-rank-one-pension, war memorial and defence technology fund. Out of additional allocation of ₹ 5,000 crore made in the regular budget under the capital head, ₹ 3,323 crore was given to DRDO, a sum of ₹ 1,000 crore was allocated for defence railway network and the balance amount was allocated for modernisation of the ordnance factories. While DRDO and ordnance factories may end up utilising the money, albeit without much clarity about the outcome, there is little evidence of other allocations announced in the budget getting utilised.



**T**he first budget presented last year by the NDA government was clearly an attempt to kindle optimism of the nation reeling under the impact of below five per cent economic growth in the preceding years.

Mindful of the expectations his budget speech would spawn, Finance Minister Arun Jaitley, who was then also holding the defence portfolio, made it clear that his aim was to indicate the broad direction in which his government wished to take the country and that it would not be wise to expect everything that must be done to achieve 7-8 per cent growth within the next 3-4 years – a *sine qua non* for fulfilling the expectations – to figure in the very first budget presented within forty-five days of the formation of the government.

## Public Expectations

It sounded reasonable in July 2014 when the last budget was presented; in February 2015, when the next budget is presented for FY 2015-16, a similar entreaty is unlikely to be met with equanimity. There were promises made in the current year's budget. Several more policy initiatives have been announced since the presentation of the budget, ranging from development of smart cities to making India a manufacturing hub. People would judge the performance *vis-à-vis* the hope held out by the government since it assumed power.

Doing everything that the government has on its explicit or implicit agenda, including modernisation of the armed forces, requires substantial budgetary outlays. Although there are indications of a moderate economic recovery, it seems unlikely that the government will be able to generate enough financial resources to translate its vision into reality, especially if the promise of bringing the fiscal deficit to 3 per cent of the GDP by 2016-17 is to be kept. Right now, this must be an immensely worrisome challenge for the Finance Minister as the next year's budget will have to be more than just 'directional'.

Finance Minister's discomfiture cannot but be a cause for concern to the Defence Minister as the size of the defence budget would eventually depend on the extent of resources that the former is able to generate. This harsh reality is at odds with the accepted view

that as a nation that faces huge security challenges on the one hand and aspires to become a regional, if not a global, power on the other, India cannot afford to be impervious to the need for strengthening its military capabilities very rapidly by increasing its defence spend. But therein lies the rub.

The gap between the requirement of funds projected by the Ministry of Defence (MoD) and the actual budgetary allocation has been widening over the years. Going by reports of the Standing Committee on Defence, this gap increased from approximately ₹ 12,500 crore in 2009-10 to a little over ₹ 81,000 crore in 2014-15.

Since 2010-11, defence budget has grown at an average of approximately 10 per cent every year. In keeping with this trend, allocation for 2015-16 could be around ₹ 2,52,000 crore – a 10 per cent increase over current year's allocation of ₹ 2,29,000 crore. If 12.44 per cent increase in the current year's defence budget had left a gap of ₹ 81,000 crore between projection and allocation, a 10 per cent increase in 2015-16 could possibly result in a shortfall of ₹ 80-90,000 crore against the projected requirement. To bridge this gap, defence budget will have to be increased by around 45 per cent over the current year's allocation. That seems virtually impossible.

## Pay And Allowances Quotient

Sooner, rather than later, the 7th Pay Commission will come out with its recommendations. If these recommendations start getting implemented sometime during 2016-17, the revenue budget of the armed forces – as indeed of all other departments – will need to be increased substantially anyway.

The shortfall in allocation for defence has affected the services in different ways. While resource crunch under the revenue segment has resulted in inadequate funds being provided for procurement of ammunition, ensuring requisite levels of serviceability of equipment and maintenance of infrastructure, the gap between projection and allocation under the capital segment has made it very difficult to process a larger number of acquisition proposals simultaneously. The capital budget for the current year, as indeed of the last year and the year before that did not provide for payment

to be made on signing of the MMRCA contract. This one contract alone, when signed, will necessitate 10 to 15 per cent increase in the capital budget.

Unless there is a dramatic improvement in resource generation or drastic reduction in the requirement of funds for defence the gap between projection and allocation is likely to persist, or even increase, making it difficult to bring about path-breaking changes in the defence and security architecture. Any drastic reduction in requirement is inconceivable as much as any significant change in the tax structure which is the primary source of revenue for the government. Failure to come to terms with the reality that there are serious limitations on how much can be allocated for defence lies at the heart of the problem.

This problem has been exacerbated by a number of other factors. Successive defence plans have been made on unrealistic assumptions about availability of budgetary support. There is a lack of synergy between the Services and other departments of MoD, mainly the Defence Research and Development Organisation (DRDO) and the ordnance factories. Absence of pragmatism has been the bane of decision-making in defence. Allegations of wrongdoing in defence purchases have stalled many a project. Some would add lack of indigenisation and complexity of procedures to this list. Inaccessibility of the MoD officials and their inability to resolve the problems as and when they arise completes a somewhat sombre picture of the present state of affairs.

However grave a situation might be, a way out of the morass has to be found. We are lagging behind our own expectations of India's defence capabilities because our expectations are not based on a realistic assessment of what is achievable within a given time frame and within the budgetary allocations. Since it is almost certain that the defence budget for 2015-16 will not match MoD's projection, the funds left after meeting the inescapable expenditure on pay and allowances and other contractual liabilities must be utilised in specific areas to achieve predefined goals.

## Absolute Imperatives

Three such areas come to mind immediately. First, serviceability of the equipment, platforms and weapon systems needs to be ensured. Second, shortages in the stock of ammunition and other war-waging reserves need to be made up. Third, acquisition of guns, submarines, helicopters, aircraft and other capabilities that form the core of the defence capability must be expedited. While, the first two activities are funded from the revenue budget, acquisitions are made out of the capital budget. The revenue budget has been under a great strain for the past several years. The capital budget, at least as of now, is not at that critical stage.

This trend is likely to continue for the next few years till the economy soars making it possible for the government to generate more revenue. Therefore, priorities will have to be set with a view to achieving the defined goals in the next three to four years – depending on how fast the goals can be achieved – at the present level of funding. The goals can always be reset if more funds become available in any subsequent year.

## Bang For The Buck

There also has to be a change in the approach to


monitoring of results. The practice so far has been to assess the performance through the prism of allocation and utilisation of the budget. This is not of much help in assessing the outcomes. Between 2002-03 and 2013-14, more than ₹ 4 lakh crore was spent on capital acquisition but it is not clear what capabilities have been acquired in the process. The outcome of the money spent on various activities must be monitored with reference to predefined targets to ensure bang for the buck.

There is no question that more funds are required for rapid modernisation of the armed forces. But it has to be understood that if higher allocations are not being made for defence it is only because more money is not available. The focus, therefore, has to be on making best use of the available resources rather than bemoaning inadequacy of India's defence budget by comparing it with the defence budget of China – whose economy is several times larger than ours.

Budgetary outlays are not the only important factor in ensuring defence preparedness. Non-budgetary factors have an equally debilitating effect. Streamlined procedures for spending money from the allocated budget have to be in place and must be reviewed regularly. There has to be decentralisation of administrative authority and delegation of financial powers to the officials commensurate with the responsibilities entrusted to them. A receptive and vibrant system of collective decision-making has to be in place to deal with the problems as they arise. This is not tied to budgetary allocation but somehow MoD has so far not been able to put its act together on any of these fronts.

## Flexibility In Fund Utilisation

In the last year's budget, there were references to allocation for one-rank-one-pension, war memorial and defence technology fund. Out of additional allocation of ₹ 5,000 crore made in the regular budget under the capital head, ₹ 3,323 crore was given to DRDO, a sum of ₹ 1,000 crore was allocated for defence railway network and the balance amount was allocated for modernisation of the ordnance factories. While DRDO and ordnance factories may end up utilising the money, albeit without much clarity about the outcome, there is little evidence of other allocations announced in the budget getting utilised.

There is nothing to be gained from announcing specific allocations while presenting the budget if it cannot be ensured that the money will get utilised before it is time to present the next budget. Probably some of this amount, which is likely to remain unutilised, could be used for meeting other urgent requirements of the Indian armed forces. Allocations must be made with such inbuilt flexibility. It is time to think out of the box. To invoke Einstein, we cannot solve our problems with the same thinking we used when we created them. 



**Amit Cowshish**

The writer is a former Financial Adviser (Acquisition) and Additional Secretary, Ministry of Defence. He has been associated with defence planning, budget, revenue and capital procurement and other matters concerning financial management in defence. He is presently a Distinguished Fellow with the Institute for Defence Studies and Analyses, New Delhi.





## REFORMING DEFENCE BUDGETING REGIME

One of the oddities of the Indian dispensation is that closer to the end of a financial year, efforts are made by MoF to withdraw unspent funds from all ministries to reduce fiscal deficit. As the Finance Division of MoD functions under the fiscal directions of MoF, it does not clear / concur any major expenditure unless given a green signal by MoF thereby forcing MoD to surrender funds. Worse, MoD gets blamed for not spending the allotted funds.

**B**udget time is crystal-gazing time. Every expectation is based more on hope than ground realities. For the services, budgetary allocation has three major connotations. One, it sets the pace of modernisation of the armed forces. As is well known, India's defence modernisation plans are lagging behind by more than a decade with close to 50 per cent of the inventory having outlived its useful service life. Two, it demonstrates government's commitment to national security through the allocation of necessary resources. Finally and most importantly, budget has a profound effect on the morale of the soldiers. It conveys to the Services that necessary wherewithal will be made available to them to defend the country and that, they will not be made to fight another Kargil War with 'whatever we have'.

For the Ministry of Defence (MoD), the Finance Division prepares the defence budget and estimates for the Defence Services, civil estimates and Defence pensions. The Defence budget consists of two heads – revenue and capital heads.

### Revenue Account

According to Rule 91 of General Financial Rules 2005, all charges for maintenance and working expenses (including pay and allowances), expenditure on

working and upkeep of the projects, renewals / replacements and additions / improvements / extensions should be debited to the revenue account. Thus, revenue procurement implies procurement of items and equipment to maintain and operate already sanctioned assets. The Defence Procurement Manual contains policy guidelines for revenue procurements.

By virtue of the fact that India has a large standing military, nearly 65 per cent of the revenue budget is consumed by pay and allowances. This expenditure is likely to rise further with the raising of a Mountain Strike Corps, resulting in an accretion of 80,000 soldiers. After catering for expenditure on other essentials like rations, clothing, fuel, transportation and critical spares; limited funds remain available for ammunition, spares, stores and maintenance of assets.

### Capital Expenditure

On the other hand, capital head covers all significant expenditures incurred with the object of acquiring tangible assets of a permanent nature or enhancing the utility of the existing assets. Further, as per Rule 91 (a) of General Financial Rules 2005, all charges for the first construction and equipment of a project as well as charges for intermediate maintenance of the work while not yet opened

for service shall also be dealt with as capital expenditure. Capital procurement would, therefore, mean procurement of all goods and services that fit the description of capital expenditure. The procedure for capital procurement is laid down in the Defence Procurement Procedure. As all modernisation plans are dependent on the quantum of resources available under the capital head, it is of critical importance and has been discussed in detail here.

### Convoluting Exercise

Preparation of the defence budget is a highly disjointed and cavalier exercise. Once the capabilities required by the Services to achieve the objectives set-out in the Defence Planning Guidelines are spelt out, a Defence Capability Plan covering 15-years time span for attaining the desired capability is prepared. The 15-year Long Term Integrated Perspective Plan (LTIPP) flows out of the Defence Capability Plan and covers systems required by the Services to meet each of the stated defence capability.

LTIPP is further broken down into five-year plans called Services Capital Acquisition Plan (SCAP). It must be mentioned here that both LTIPP and SCAP are prepared without taking into account the funds likely to be made available to MoD. In other words, these plans are mere wish lists with no assured financial support.

Annual Acquisition Plan (AAP) of each Service is a two year roll on plan for capital acquisitions and consists of the schemes included in SCAP. The draft AAP is prepared in two parts. Part A comprises carry over schemes from AAP of the previous year and approved schemes. All new proposals are included in Part B. Requirement of funds for capital expenditure is accordingly worked out Service-wise. More than 90 per cent of the capital budget goes on committed liabilities, leaving little for fresh acquisitions. It is the most worrisome aspect of the whole exercise.

Proposals submitted by the Services are aggregated at Headquarters Integrated Defence Staff (HQ IDS). MoD merely compiles the lists and forwards them to the Ministry of Finance (MoF) for incorporation in the union budget. As stated earlier, in the absence of assured funds support, the lists prepared by the Services are highly ambitious. They are based more on aspirations than realistic estimations.

On receipt of allocations from MoF, MoD sub-allots funds to the Services and other departments. As funds allocated are always far less than the demands, the Services are forced to prioritise their requirements for different budget heads. All fresh procurement proposals of AAP get re-examined and scrutinised for determining their inter se operational urgency and likely cash out-flow during the current financial year.

One of the oddities of the Indian dispensation is that closer to the end of a financial year, efforts are made by MoF to withdraw unspent funds from all ministries to reduce

fiscal deficit. As the Finance Division of MoD functions under the fiscal directions of MoF, it does not clear / concur any major expenditure unless given a green signal by MoF thereby forcing MoD to surrender funds. Worse, MoD gets blamed for not spending the allotted funds.

Another aspect that deserves mention here is the fact that there is no system of carrying forward the unspent funds to the next financial year. Surrendered funds lapse and go to the kitty of MoF. Such a policy has strange fallout; every ministry tries to expend all allotted funds. Closer to the end of a financial year, it is always a race against time. Many times funds are spent imprudently on lesser requirements, only to avoid their surrender.

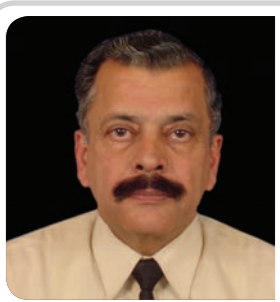
### Expectations From Budget

Unquestionably, the first issue of concern relates to the size of the Defence pie in the forthcoming budget. It is fervently hoped that the Defence allotment gets close to 3 per cent of GDP. Presently, the state of operational preparedness of the armed forces is alarming. The current profile of equipment held is dismal. Instead of 30 per cent state-of-the-art equipment, the holding is mere 15 per cent. More worryingly, 50 per cent of the inventory needs emergent replacement. Therefore, funds allotted under the capital head will be the main interest of all those who are concerned with the current 'hollow' state of the armed forces.

Modernisation of the armed forces is going to be a Herculean task, requiring commitment of over US\$ 100 billion. In addition to regular upgradation plans, India will need to make up the existing deficit of 15 per cent of the state-of-the-art equipment. India is implementing many ambitious projects like Future Infantry Soldier as a System; Network Centric Warfare; Tactical Communication System; aerospace capability systems; night-fighting equipment and simulators. These force multipliers are highly cost-intensive.

As the entire dated inventory cannot be replaced in a short period, upgradation of equipment to increase its useful service life is a commonly exercised option. Some of the major upgradation programmes involve tanks, artillery guns, anti-aircraft weapons, helicopters, fighter aircraft, fire control radars and submarines. The list is indicative and not exhaustive. These

**Both LTIPP and SCAP are prepared without taking into account the funds likely to be made available to MoD. In other words, these plans are mere wish lists with no assured financial support**



**Maj Gen  
Dr Mrinal Suman  
AVSM, VSM (Retd)**

The writer is India's foremost expert in myriad aspects of defence procurement procedures and offsets. He heads Defence Technical Assessment and Advisory Services Group of the Confederation of Indian Industry. A prolific writer, his articles are regularly translated in many languages and his views command immense respect in India and abroad.



projects are likely to entail an expenditure of up to US\$ 10 billion.

Concurrently, the government needs to rationalise and streamline the whole budgetary planning process as well. A public version of the perspective document, outlining the Technology Perspective and Capability Roadmap (TPCR) covering a period of 15 years was issued by HQ IDS in April 2013. TPCR is a derivative of LTIPP and delineates the envisaged capability road map for all components of the armed forces. In the absence of assured financial support, preparation of LTIPP and TPCR is considered to be an academic, speculative and conjectural exercise, without any credibility.

The sole objective of issuing TPCR is to give adequate advance notice of impending procurement proposals to the industry to facilitate considered investment decisions and explore avenues for the development / acquisition of required technologies. However, industrialists do not base their investment decisions on the projections that lack assured commitment of funds and are prone to frequent changes.

Therefore, it is essential that MoF indicates likely budgetary support to MoD for the plan periods. Such a step would ensure that the perspective plans are not made in a vacuum. It will also help the Services in fixing priorities *ab initio*, as per the likely availability of funds.

As was done at the end of the last financial year, MoF has ordered a cut of ₹ 13,000 crore in the capital outlay for the three Services in the current fiscal (2014-15). Such a cut impacts the modernisation plans adversely with cascading effect. As it is, the capital budget is always grossly inadequate and the bulk goes into meeting the committed liabilities, leaving limited funds for new acquisitions. Therefore, funds allotted for capital procurements should never be withdrawn.

The provision of unspent funds lapsing is responsible for the present tendency of expending maximum funds before the end of a financial year. In the case of MoD, the thrust shifts to booking of expenditure rather than spending funds on operationally emergent requirements. To prevent injudicious spending, it will be far more prudent to allow the unspent funds to be carried forward to the next financial year and added to the fresh allotment of the next year.

### Encourage SMEs

Considering that the small and medium enterprises (SMEs) constitute the backbone of the defence industry the world over and are at the heart of technology innovation, the government must hold their hand and extend fiscal incentives (including tax breaks) to them. Both the Defence Production Policy of January 2011 and DPP promise a fund to assist SMEs engaged in defence manufacturing. It must be operationalised at the earliest.

As is done by all developed nations, tax and

duty structures should be rationalised to facilitate growth of the indigenous defence industry. Select defence projects can be accorded the status of deemed exports.

Financial powers of the functionaries must be commensurate with the responsibility assigned to them. They should have full authority to spend the funds required to achieve the specified targets. For capital procurements, financial powers of the Service chiefs should be further enhanced. For revenue expenditure, powers should be increased at all echelons, both with and without financial concurrence.

Budgetary allocation by itself means little. It must be administered and overseen by an effective regime for obtaining optimum returns. Unfortunately, the current dispensation is grossly inefficient, bureaucratic and sluggish.


In addition to preparing the Defence budget, the Finance Division exercises total financial control over its expenditure as well. It includes according financial concurrence to all expenditure proposals, account keeping and auditing. Unfortunately, performing of the above functions is totally beyond the competence of the Finance Division. There is a total mismatch – most Defence Finance officials are incapable of grasping minutiae of financial imperatives and are ill-equipped to perform Defence economic advisory functions.

**Presently, the state of operational preparedness of the armed forces is alarming. The current profile of equipment held is dismal**

### Defence Finance Cadre

There is an urgent need for India to have a specialist cadre of experts who are proficient in various disciplines concerning Defence economic imperatives. They should be fully conversant with rational application of

economic tools to help evolve contours of dynamic linkages between well spelt-out strategic objectives and allotted resources for most advantageous results. They should also be capable of developing indigenous models for performance evaluation criteria, duly supported by methodological research support. The role of the present cadre of the Indian Defence Accounts Service should be restricted to the provision of accounting cover and audit, as hitherto fore.

To sum up, the forthcoming budget must adopt a three-pronged strategy to initiate reforms to impart professionalism and objectivity to the defence budgeting process. One, likely availability of funds must be made known to MoD well in advance to facilitate formulation of realistic plans. Two, adequate funds must be allotted to the capital head to expedite modernisation plans. No funds should be withdrawn after allotment. Carry forward of unspent funds to the next financial year should be allowed. Finally, counsel of Defence economic advisors must be made available to MoD, both for the preparation of Defence budget and to ensure that resources committed are applied optimally to achieve national security objectives. 

## DEFENCE SELF-RELIANCE TORPEDOED BY PROCUREMENT PROCEDURE

There is no incentive for innovations and developmental projects. Even after a product is designed and developed by DRDO / industry, there is no assurance that the product will be accepted by the Armed Forces. This despite the product having successfully undergone certification, trials and testing. All this is due to the concept of NCNC (No Cost and No Commitment). One can understand No Cost, but once the product is developed successfully, the MoD needs to give Full Commitment.



The goal of achieving self-reliance in Defence, if at all it was ever there, has been no more than lip service, to have left any impact of any nature, outside of the South Block. This is basically due to inadequacies in perception and policy. Can the government with its emphasis on a 'Make in India' campaign cause a change for the better?

Government of India, Ministry of Defence has rolled out the Defence Procurement Procedures, in conformity with the General Financial Rules, the first such document came out in 2005. Since then, successive refinements have been incorporated in newer versions of the DPP, such as the DPP 2013 in vogue today. Since DPP 2005, the Aim of the procedures has been the same: "The objective of this procedure is to ensure expeditious procurement of the approved requirements of the Armed Forces in terms of capabilities sought and time frame prescribed by optimally utilising the allocated budgetary resources. While achieving the same, it will demonstrate the highest degree of probity and public accountability, transparency in operations, free competition and impartiality. In addition, the goal of achieving self-reliance in defence equipment will be kept in mind".

### Myths And Reality

It is quite ironic that the MoD has not been able to adhere to even one of the tenets that have been enshrined in its own aim (an Aim that has been in existence for more than a decade). Expeditious procurement, for example, is a far cry and it is a shame that our Armed Forces, that function beyond the call of duty, cannot at the least expect to be equipped adequately for the multifarious tasks at hand, be it external aggression or internal threat. There is not a single instance in the entire procurement proposals, that the MoD has been able to adhere to timelines, so the next tenet of 'time frame prescribed' is not for adherence, so it seems. Highest degree of probity and accountability go for a six, considering the numerous instances of cancellations and retractions of RFPs, as also the number of scams that have engulfed the ministry in the last decade. The only solution that the MoD ever had was one of 'blacklisting' of companies and expeditious issue of 'abeyance orders' (it was probably here that they acted extremely fast). 'Transparency', is a myth, the industry is forever in the dark, as is the DRDO. There is never a clarity on numbers and plans as crucial information required for planning industry infrastructure and investment is never available.



**Col KV Kuber (Retd)**

The writer is alumnus of the prestigious National Defence Academy and the Technical Staff College. He specialised in Electronic Warfare. Commanded an Electronic Warfare Regiment in operations and has conducted EW operations. He founded and established the DOFA and was the chief architect of the offset policy since its inception in 2005. He has been an Adviser with the National Small Industries Corporation and played a key role in bringing MSMEs into the mainstream defence business, through NSIC. Presently, he is an Adviser with the DRDO for Technology Acquisitions.



Let us now discuss the less important tenets of the aim and then we will know where we stand and what we need to do in terms of corrective action. How can a nation allow 'free competition' and 'impartiality' when it concerns its strategic systems and procurements for a strategic sector? This is a misnomer and may be considered for deletion from the aim. In any case, as far as 'self-reliance' is concerned, it was an additional aim and deliberately *kept in addition*, only that it needs to be kept in mind. What it implies is that, in so far as 'self-reliance' is concerned, it will be considered after all the other tenets of the aim are met, since it was in addition in any case and that also it will be kept in mind and no action on that can be expected. *This exactly is the fallacy in the DPP and the MoD, true to its belief, is adhering to this principle in full earnest.*

### No Clarity For 'Buy Indian'

Let us now examine how the DPP is formulated and how the formulation is far away from its additional goal of achieving 'self-reliance'. One of the positives of the DPP 2013, is that it has outlined a priority for procurement, without detailing the requirements that need to be met before moving on from one to another in the family of categorisations. For example, what are the necessary and sufficient conditions for a particular proposal to be categorised as say, 'Buy Indian' and how this definition needs to be addressed. There is a complete lack of clarity in this regard. If for example, these conditions were met, then there could be no reason for the categorisation committees to adopt the next higher one. The rotational nature of officials entrusted with this onerous responsibility, further dilutes the system. There is no concept of 'systemic knowledge' and any precedence that may be available (is buried deep down somewhere), they are sometimes quoted selectively (mostly out of context). It passes muster, basically due to lack of knowledge in the system.

Let us analyse 'Buy Indian', for example and see how this is formulated. Incidentally, this occupies the pride of place in the system of hierarchy and is supposed to be considered as the preferred mode of procurement. 'Buy Indian', mandates a minimum of 30 per cent indigenous content on cost basis. There are no guidelines laid down to arrive at this categorisation. Simple criteria, such as (i) existence of indigenous development in the area with a certain level of success or (ii) if such technology is available with any of our research agencies with a certain level of technology readiness or (iii) if the Indian industry has the requisite capability to manufacture even with incremental support, such programmes may be recommended in this category. If there is a doubt in stated capabilities, the benefit must reside with the Indian industry and domestic development agencies. However, the converse appears to be true to the MoD, which appears to be more comfortable with procurement from foreign sources. Often, there

is a distinct feeling, that the DPP is biased towards 'Buy Global', from foreign sources. This is because, the *modus operandi* for categorisation of a proposal, to be made in favour of 'Buy Indian' is not laid down and DRDO and Indian industry have little say in the planning process. A serious consideration to 'Buy Indian', will help achieve the distant dream of self-reliance.

**Buy Indian And Buy Global.** In actual fact, the DPP, does not differentiate between, 'Buy Indian' and 'Buy Global'. In the case of 'Buy Indian', a requirement of 30 per cent indigenous content is specified and in case of 'Buy Global', a minimum of 30 per cent offsets is mandated (also, though not in all cases). This actually means that any foreign original equipment manufacturer (OEM) can come up and participate in any of the RFPs with a 70 per cent foreign content and this is completely acceptable to the MoD. Therefore, 'Buy Indian', in its present disposition, is a misnomer. The content is hardly Indian by any standards; at least that is what the MoD expects. This needs to change, in interest of the present government's concept of 'Make in India' and 'Made in India'.

**How Can This Change Happen?** For this we need to revisit the definition of 'Buy Indian', as outlined in the DPP (since DPP 2005 till DPP 2013, this has remained unchanged). To quote the DPP 2013, 'Buy Indian', must have a minimum of 30 per cent indigenous content on cost basis. This clearly means that the minimum indigenous content expected is 30 per cent and definitely this is not the maximum expected indigenous content. If this were true, then why is it that the MoD has till

date, even after a decade of procedure put in place, not specified even a single 'Buy Indian' proposal with a requirement of indigenous content more than 30 per cent? MoD, has instead taken the path of least resistance and has been applying this as a standard procedure / set rule and in every RFP under 'Buy Indian', category, has never laid down a percentage more than 30 per cent. This is because of two major factors; one, lack of intimate knowledge, that the MoD needs to be constantly educated, since the officials in responsible positions, are on a rotation basis, without due consideration to the adverse implication on the national development. The second, is the desire to procure from foreign sources, by neglecting domestic capability, even if it existed only in parts of the entire system required. This desire stems from the onerous operational requirement that cannot wait. Notwithstanding that the entire process of procurement, even from foreign sources is not less than five to six years from issue of RFP, provided the contract is signed in the stipulated time frame advocated by MoD themselves (*they, the MoD, have not even in a single instance stuck to the time frame as stipulated in the DPP formulated by themselves, since 2005.*)

**So far as self-reliance is concerned, it will be considered after all the other tenets of the aim are met, since it was in addition in any case and that also it will be kept in mind and no action on that can be expected**

### Hocus Pocus

Therefore, in cases, where some considerable design and development activity has taken place, through serious investments (DRDO may provide the necessary inputs in such cases), all such proposals may be categorised as 'Buy Indian' with a prescribed indigenous content, which may be more than 60 per cent in many cases. Should this not happen, then, despite considerable efforts in indigenous development, even after it is categorised as 'Buy Indian', foreign companies may find an Indian company willing to front end the tender, by just a 30 per cent bare minimum indigenous content and beat the price, as against a genuine indigenous product that may have higher degree of indigenous content. There are many examples to prove this tendency.

**Where Does The Fault Lie Then?** The basic problem is in indication of MoQ (minimum order quantities). MoD has been pretty transparent with foreign vendors in terms of quantities, but are reluctant to share similar information with Indian vendors. While MoD can specify an MoQ of 126 aircraft in the MMRCA case, they could indicate a mere 20 for the development programme of LCA. Why will the indigenous programme not suffer then? They (DRDO and indigenous vendors) do not have visibility of numbers, they are not confident of the hand holding by the user, they have to invest in the proposal all by themselves and there is no guarantee even if they succeed to please the user with great credentials. The programme can then at best be categorised as 'Buy Indian' (without specification of a minimum indigenous content) and once again the competition is open to all who can come up with a foreign partner exhibiting a bare minimum domestic content of 30 per cent as mandated. Can the MoD assure orders for all proposals that have adopted the developmental route (given a degree of success in a prescribed mutually acceptable time frame)? It then makes sense for the DRDO and private industry to invest upfront.

**Make Procedure.** If there is one major flaw in the DPP, then it is in the 'Make' procedure. This is the most complicated of all the categories and also the most challenging. Since the first formulation of the 'Make Procedure', in 2006, even after eight years, we still do not have a single project conceived on paper by the MoD under the 'Make Procedure'. Obviously, something is wrong in a very major way. Some of the aspects are discussed in the subsequent paras.

**Concept.** Discussions on Make procedure were initiated in the year 2003 and it took almost more than three years to finally include the first Make procedure as part of DPP 2006. There was a general feeling then, that DRDO was not efficient in conceiving projects involving design and development and hence the SHQs / MoD must handle such large projects with huge financial outgo. However, even after almost a decade of the procedure being in vogue, not a single project has been conceived thus far. Where does the fault lie? Is the responsibility not squarely with the MoD for an inability to conceive even a paper to initiate procurement under Make procedure? Only after a formal RFP, can the industry step in for manufacture. Therefore there must be something fundamentally wrong in the procedure. Mere tweaking

of the existing long procedure may not yield desired dividends. Here fundamental changes are required. Probably, the entire DPP must be re-written and not merely tweaked, each time adding to the inadequacies of the previous versions.

**Risk Taking Ability.** The procedure, presently in vogue, involves high risk for industry and low risk for the government, since the government has taken all possible precautions (notwithstanding delays incurred in capability building), before any funds can be released. It appears that the procedure has been written to save the government's 80 per cent share of funding. The government needs to exhibit a greater risk taking ability, in the interest of the project and capability building in the industry. This is typically the case when Finance is accorded undue importance in policy making, since an intervention by Finance will be to save the government's funding and rightly so from their perspective, as they have little accountability towards capability building. Capability building comes with risks and in this case, calculated and informed risks and these must be taken.

**IPMT Vs PD.** The concept of IPMT (Integrated Project Management Team) is to actually replace the PD (Project Director) and Programme Director of DRDO Make programmes. Herein lies the major problem. A floating population cannot be expected to handle long-gestation projects and a period indicated for a tenure in Delhi at the Service HQs (like three years) is considered a routine insertion, while non-serious assignments like in Defence Exhibitions, enjoy much larger tenures. Bureaucracy, that handles such projects at decision-making levels are also of shorter visibility tenures. Chairman IPMT, must necessarily be made completely accountable and have a tenure with assigned and achievable deliverables in designated time frames, with deliverables determining the tenure and not vice versa.

**Domain Knowledge.** IPMT does not and cannot have the domain knowledge in programme management and project management functions. While the various committees are in advisory capacity, the IPMT needs to be enabled with greater powers to be able to take informed decisions. However, the IPMT will forever lack the domain knowledge in design, development functions, these are far more complicated than mere print to manufacture. Risk taking ability of Programme Director / IPMT will be in direct proportion to the domain knowledge and from here stems gut feeling and intuitions. Time and cost overruns are mostly a function of the decision taking ability of the IPMT. Projects normally take a different shape on ground than what they were seen on paper. Manoeuvring over various aspects of the project, such as design validations / variations, innovative solutions, market volatility, raw material supply vs demand, integration of various subsystems and so on do have tremendous effect on the project. Since no advance is paid and industry is experienced with government release of funds, huge risk taking ability from industry cannot be expected overnight. IPMTs must be fully empowered and enabled to take informed decisions in time towards timely completion of projects. As such, minimum reference to DPrB or any other such



committees must be consciously avoided. IPMTs must have an indefinite tenure, with defined milestones to be achieved in definite time, before any change can be incorporated. All time overruns must be accommodated in the tenure.

**MSMEs.** *If India lives in villages, Industry lives in MSMEs.* MSMEs are fundamental to the sustenance of large industries. Lack of capability in MSMEs, will propel large integrators to look beyond the geographical boundaries for sourcing their subsystems. The DPP does mention development of Defence Industrial Base (DIB) and the base constitutes of MSMEs alone. The base can be developed only if there is a clear mandate for large integrators to source from MSMEs. The Make procedure may mandate a minimum of 35 per cent sourcing from MSMEs in each project by value. In all 'Buy Indian', programmes, once again the winning contractor must be mandated to source a minimum of 30 per cent from MSMEs. This must form a necessary condition in the EOI (Expression of Interest) and subsequently in the DPR (Detailed Project Report) of 'Make' and the RFPs for 'Buy Indian' programmes. This is the only way through which technology can be harnessed in quick time and will be available with a distributed knowledge. Such a mandate is essential, in all Make projects. In other categories of Make programmes such as category B and C, where MoD does not make any investment in terms of finance, they must make definite investment in terms of knowledge sharing, making available resources and assure orders for all successful developmental projects.

**Design And Development.** This is the most crucial to the entire process and there must not be any restriction of only essential parameters on proven products and desirable on the unproven ones. Such restriction actually inhibits the requirement of capability building and Services may have to settle for less, even in Make programmes that have long gestation periods. In this context, there is a case for 'Come, Make in India' to be slightly modified to, 'Come, Design and Make in India'. Presently, there is no incentive for an increased indigenous content. There is no incentive for innovations and developmental projects. Even after a product is designed and developed by DRDO / industry, there is no assurance that the product will be accepted by the Armed Forces. This despite the product successfully having undergone certification, trials and testing. All this is due to the concept of NCNC (No Cost and No Commitment). One can understand No Cost, but once the product is developed successfully, the MoD needs to give Full Commitment; this should change to NCFC (No cost Full Commitment), only then will the industry be motivated to invest more in research and development. Contractors tend to just meet the minimum and the MoD is content with bare minimum. This is clearly an undesirable situation.

**Prisoners Of Procedure.** The officials concerned with procurement have often been described by many in the industry as Prisoners of Procedure and rightly so. Fear of


unknown (CAG / CVC etc) coupled with lack of systemic knowledge is the prime reason for decision-making or the lack of it. The spirit of the policy has been forgotten for the letter and the officials concerned are attached to the latter. Probably the spirit is not even known to the ones implementing the policy and are completely and totally governed by the letter alone. Capability building of the industry and arming our Armed Forces cannot be subjected to nuances of a procedure. There ought to be a greater motivation for the nation for equipping its Armed Forces.

**Self-reliance And DPP.** In the context of above, DPP is pretty far from addressing the concerns of self-reliance. This is clearly evident from the definition of 'Buy Indian' that occupies the pride of place in the DPP and 'Buy Global' which is supposed to be the last in order of preference. While 'Buy Indian' mandates a minimum of 30 per cent indigenous content, 'Buy Global' prescribes a uniform 30 per cent offsets. In both cases, foreign OEMs enjoy a 70 per cent foreign content. Where is the incentive for an increased indigenous content in 'Buy Indian' programmes and why should an OEM ever attempt to discharge more than the prescribed 30 per cent offsets?

**Local Offsets.** As indicated earlier in this article, all Indian programmes like 'Buy Indian', 'Buy and Make Indian', and 'Make' should also mandate the large integrators who win these contracts, to compulsorily source a minimum of 30 to 35 per cent from MSMEs. This will encourage large integrators to think big and concentrate on integration, design improvements and leave the subsystem level manufacture to the ones who do it best, with least overheads, the MSMEs. This will help

build a relationship in the supply chain, born out of inter-dependence. There will thus emerge a long-lasting relationship founded on basic principles of business.

#### Bias For Foreign

In conclusion, it is felt that the DPP is biased towards foreign procurement and Make procedure has been written to save the 80 per cent funding of the MoD. Where does capability building figure in all this riddle of a DPP? Little has been done through policy intervention to encourage domestic production. Little has been done to develop DIB (Defence Industrial Base). Ignoring the development of MSMEs will be only at the peril of defence preparedness. Spirit of DPP has fallen victim to the Letter of the DPP. Developing domestic capability in the country for the industry to be able to sustain the requirement of the Armed Forces cannot be a matter of following a procedure. Equipping our Armed Forces with state-of-the-art weapon systems and equipment cannot be equated with public procurement. There could be guiding principles for equipping the Armed Forces, a long-term vision lighting the path for effective implementation of expeditious procurement must be adopted. This is the requirement of the day. 

**Equipping our Armed Forces with state-of-the-art weapon systems and equipment cannot be equated with public procurement**



**Subimal Bhattacharjee**

The writer was formerly heading a multinational defence corporation in India and writes on defence and cyber security issues.

## INDIGENOUS DEFENCE MANUFACTURING IN INDIA

Manohar Parrikar has consistently indicated the need to build local capabilities and reduce dependence on foreign suppliers. The best from him was in January this year at a seminar held on the sidelines of Vibrant Gujarat in Gandhinagar where he said clearly that India needed high-end technology in Defence and his government was already working to release a document in two to three months on a suitable model for Defence manufacturing and procurement.

**P** rime Minister Narendra Modi's maiden Independence Days speech from the ramparts of the Red Fort last August was a clarion call for India to realise its full potential. His slogan 'Come: Make in India' was indeed an effort to revamp the manufacturing industry in the country which needed a mission mode approach in almost every sector of the industry. The Defence industry where the strategic focus on indigenisation and military manufacturing capacity building has been highlighted for many years now but never taken off, could be one of the biggest gainers if this policy is pursued in right earnest.

#### Indigenous Defence Production

No doubt Defence has been a special focus area of the Modi government and the Prime Minister has made it clear on more than one occasion about the need to build defence capabilities and an encompassing ecosystem. The first visible sign of such a stance was witnessed towards the end of June last year when the press note issued by the Department of Industrial Policy and Promotion (DIPP), which functions under the Ministry of Commerce and Industry (MoCI) under recommendations of the Ministry of Defence (MoD) that simplified the licensing regime for defence equipment manufacturing and only four categories of Defence equipment were defined that required compulsory production licenses and all other items including those for dual-use were cleared

and required no licenses. Then came the budget in July 2014 where the Finance Minister Arun Jaitley who also doubled as Defence Minister reiterated this focus with the few changes in the allocation for Defence which included a significant increase for Defence research. He also announced the increase of the foreign direct investment (FDI) in defence from the prevalent 26 per cent to 49 per cent in all areas. With the appointment of Manohar Parrikar as the Defence Minister in November last year, the focus on enabling actual indigenous manufacturing and defence exports, hitherto almost unknown got the right fillip.

#### New Document

While a comprehensive review of the Defence procurement and Defence production procedures are on, Parrikar has consistently indicated the need to build local capabilities and reduce dependence on foreign suppliers. The best from him was in January this year at a seminar held on the sidelines of Vibrant Gujarat in Gandhinagar where he said clearly that India needed high-end technology in Defence and his government was already working to release a document in two to three months on a suitable model for Defence manufacturing and procurement. Effort was also on to indicate which items should be manufactured in India over a period of time and that list would be consolidated gradually and there would be a focus on high-end technology. He indicated the need for total



overhaul in conceptualising and thinking with regards to defence manufacturing and procurement and also a road map for investments so that after spending crores in certain projects the goalpost doesn't shift suddenly as it has happened in many cases. In other words he has put in motion an overall strategy that will look at the threat scenario and work in a time-bound and optimal manner to realise the goal of sufficient equipping with indigenous capacity.

### Cautious Approach

While modernising and equipping remains of paramount importance, the pertinent point is what gives a jump-start to all the aspirations? Firstly, the Technology Perspective and Capability Roadmap as laid out by MoD giving details of the equipment and technologies required by the armed forces needs to be better understood and focused with inputs taken from the industry and defence R&D community. Secondly, will 49 per cent FDI cap and management control in Indian hands give the right impetus to get technology from foreign OEMs as the initial media euphoria around the MoCI's proposal to take defence FDI to 100 per cent has been lost? No doubt critical foreign technology will never come at this cap, but the Indian industry should be galvanised to rope in foreign partners with significant standing in dedicated areas. Thirdly, the current scenario where the private industry folks are pitted against each other and the Defence Public Sector Undertakings has to be relooked and a clear approach to foster some islands of expertise has to be done soonest so that the private sector actually make the investments in R&D, technology and facility and those investments don't go waste. Currently they have adopted a cautious approach and rightly so because with less than 2 per cent in R&D investments hardly any Defence behemoth can be expected. Concurrently the small and medium industries have to be significantly boosted to be able to support the tier 2 and tier 3 levels. A mission mode approach to identify and inform private sectors of the areas of opportunities along with incubation facilities will go a long way to build organisations with competence that can survive beyond one project. At the same time it is key not to reinvent the wheel in non-critical sector and so partnerships with foreign companies should be encouraged. Currently with the situation in the global arms industry many of these foreign entities would be keen to find the right partners in India to keep their facilities running.

### Defence R&D

Even before manufacturing starts, the focus on technology and design capabilities has to be worked upon. Much of the R&D efforts of the DRDO have not produced optimal results and while giving the DRDO a major financial boost in tune with the BJP election manifesto, the government should ensure that its revamped clusters and labs should be made to work more closely with the three Services and industry so that the former can be convinced that R&D efforts are oriented towards their needs while the offtake for the industry for production becomes much more coordinated and faster. Ideally a certain portion of defence R&D budget should also be made available to

the private sector community which has been granted licenses for defence manufacturing. Not only will that set a goodwill example, but also have better prospects for investments as new and diverse areas can be targeted. With battlefield shifting to electronics and space, focus for R&D should be on these frontier areas and past unsuccessful efforts on guns, tanks and vehicles should be disbanded completely or only taken up after a base technology transfer from some foreign original equipment manufacturer (OEM) has been obtained. Some of the lessons learnt by the MoD from the efforts to implement the 'Make' procurement programmes in recent years will be an indicator of how to proceed and integrate the private sector better.

The focus on manufacturing will have to realistically address the issues that have been plaguing the sector for years. Facilitation and single window clearances have to happen right from seeking permission and clearances for land, environment to the support infrastructure, particularly, roads and power and also the issues around taxation have to be addressed. The military industrial complex ecosystem has to be fostered in some of the hubs so that companies can set up their manufacturing upto the third tier. Defence manufacturing has to sustain long gestation periods and so unless there is a realistic opportunity and time bound procurement, it would be difficult for any investor to have the confidence to sustain.

The Finance Minister's focus on the budget allocation for Defence will need continued attention. Defence as percentage of the GDP has always been less than 2 per cent in India and that definitely isn't optimal. While the total budget allocation for defence sector was ₹ 2,29,000 crore for 2014-15 compared to the ₹ 2,24,000 crore announced in the Interim Budget in February 2014 and significantly up from ₹ 2,03,673 crore for 2013-14, the whole of that increase of ₹ 5,000 crore from the interim budget has been earmarked for the capital expenditure where the total allocation is ₹ 94,587.95 crore up from the revised budget of ₹ 78,872.23 crore for 2013-14. A consistent availability of funds has to be there for the next ten years to cover the significant gaps that have happened over these years of delays and procedural inefficiencies.

Much of this is on the radar of the new government and so while the next budget is presented by this government in February this year – the first full budget of the Modi government – allocations should reflect a long-term strategy to realise steady achievable goals of indigenisation. It is very likely that around the time of this budget, the Defence Minister would be ready with the changes to the Defence Procurement Policy and Defence Production Policy. Unless these policies are oriented and the optimal ecosystem created, the Prime Minister's vision of making India also a Defence equipment exporter will be just a wishful thinking. As per Parrikar, the total expenditure on direct payments to foreign vendors for Capital Acquisitions for the Army, Navy and Air Force during the last five years was ₹ 1,03,535.52 crore and this huge import bill for Defence is not only very high but also has its strategic implications not to forget the consequences for the economy, development and unemployment in the country. **DSA**



## BOTTLENECKS IN DEFENCE ACQUISITIONS

The Service Headquarters, where the process of procurement begins, cannot absolve themselves of their share of responsibility in delay in capital acquisitions and pass the entire buck to bureaucracy. The time taken by them in formulation of Qualitative Requirements (QRs) and not to talk of the quality of QRs, is the single biggest reason for failure of majority of schemes and a serious bottleneck in defence acquisitions.

*“Controversies over military procurement are a common phenomenon around the world. Politicians who fund it are often displeased with the cost overruns and performance shortfalls and some may consider it to be sheer waste. The armed forces are frustrated who may go into battle not as well prepared as they could be and procurement specialists feel that their attempts to manage the military procurement process are being constantly undermined. Even defense companies are frustrated by military procurement's seemingly needless complexity.” – Felix K Chang*

While this may be the scenario world over but Indian defence acquisitions appear to be really testing everyone's patience with little worthwhile procurement being done.

The DPP has been revised nine times (seven revisions and two addenda) in last 12 years, revised offset guidelines issued in 2012, Defence Offset Facilitation Agency has evolved into Defence Offset Management Wing, IL has been tweaked to give some clarifications, FDI increased from 26 per cent to 49 per cent, Defence Production Policy issued in 2011, push given to indigenous defence production and a host of other similar policy changes made or steps have been taken. The Indian defence procurement procedures have been a work in evolution during the last 12-13 years. However, the results so far have been dismal to say the least. Despite the policy evolution, so

many shortcomings have been pointed out by analysts and experienced procurement experts in the system and policies, that a document more voluminous than the DPP itself can be compiled. Therefore, while it is not possible to compile the list of bottlenecks in the acquisitions process, some of the issues have been highlighted here.

The Indian Army has been struggling to induct artillery guns since the famous *Bofors* were procured in 1987, MMRCA contract is yet to be signed even though the process was initiated in 2004, even as simple an item as a multipurpose tool (something akin to a Swiss knife) is yet to see the light of the day after a RFI was posted in 2010 and the list is



**Col Sanjeev Dalal (Retd)**

The writer has spent more than 26 years in Indian Army where he was in charge of Acquisitions in his last tenure. An alumnus of Defence Services Staff College, Wellington, he is a domain expert in Camouflage and Chemical Biological Radiological Nuclear (CBRN) Defence.



endless. The dwindling submarine fleet or the depleted fighter squadron strength have failed to galvanise the Indian defence procurement machinery.

### Service Headquarters

The Service Headquarters, where the process of procurement begins, cannot absolve themselves of their share of responsibility in delay in capital acquisitions and pass the entire buck to bureaucracy. The time taken by them in formulation of Qualitative Requirements (QRs) and not to talk of the quality of QRs, is the single biggest reason for failure of majority of schemes and a serious bottleneck in defence acquisitions.

QR is the first step of procurement, articulating the user's requirement of what and how a system is expected to perform. It has maximum influence on subsequent stages of procurement. Formulated by generalist officers, with first time exposure in equipment cells, limited knowledge of defence market intelligence and technology, inadequate idea on availability of testing facilities in various laboratories, trial and evaluation methodologies etc the QRs fall flat during subsequent evaluation stages. Posting RFI and scanning websites is insufficient to formulate QRs. Inexperienced officers from field formations cannot even formulate the innocuous looking RFI which would be the basis of QR formulation.

Similar is the situation while preparing the statement of case for the 'all important' categorisation and acceptance of necessity. Inexperienced programme managers, with little knowledge of technological advances and industrial capability, cannot be blamed for preparing complex documents with suggested categorisation, life cycle costs etc. Intensive interaction with domestic industry and representatives of Foreign OEMs is a must and this presently is not encouraged.

The Service Headquarters and especially the Army, has not been able to overcome the problem of having experienced and knowledgeable officers for worthwhile tenures in the relevant Equipment Cells. It reflects poorly on the commitment of higher military leadership towards modernisation of defence forces, since HR policies are well within their domain to overcome such a problem.

### DPP And Other Policies

All delays arising out of varying perceptions or interpretations of various issues in the DPP could be drastically reduced if well thought out guidelines are evolved. Just to highlight the lack of clear guidelines in the various procurement policies, few areas are enumerated below:

- Categorisation: Guidelines for selection of a particular category in preference to another identification of Indian companies to whom RFP can be issued. Since most of the equipment presently is not being manufactured by Indian companies, how

**QR is the first step of procurement, articulating the user's requirement of what and how a system is expected to perform. It has maximum influence on subsequent stages of procurement**

would the claim of 30 per cent indigenisation be verified.

- How to deal with single vendor situations – the bane of Indian procurement programme.

- ToT and IPR issues: Large number of technology transfers have taken place till date but a reality check about their utilisation and output may raise some very uncomfortable questions. Even in DPP 2013, where indigenisation is the focus and ToT would become

more frequent, there is very little guidance on contractual provisions for IPRs in technologies that are being received by Indian Production Agencies. For instance, while the new offset guidelines allow higher multipliers in case of technology acquisition by DRDO, the relevant sub-clause contains no guidelines on further transfer of these technologies to Indian producers; since DRDO is not a production agency itself.

- Cost Estimation and arriving at L1 bidder based on varying technologies used, life cycle costs etc.

- The information provided by the Services in the LTIPP is not sufficient to identify and initiate objective technology development programmes including identification of offset opportunities in advance. Posting the public version of the LTIPP, in the form of Technology Perspective and Capability Roadmap on the MoD website is a progressive step which will be effective if it is presented in an actionable language.

The thrust of DPP 2013 is indigenisation and it may succeed, provided timely steps are taken to ensure that the procurement related policies do not get bogged down by unanswered questions and lack of guidelines.

No Cost, No Commitment Trials are another dampener to indigenisation since such trials:

- Discourage small and medium enterprises (SMEs) due to exorbitant costs. 30 per cent indigenous content required at trial stage itself would inhibit participation by SMEs since all Indian manufacturers who bring technology from a foreign partner to produce trial samples will bear huge costs in initial set up, whereas only the L1 bidder would be able to recover his investments with the rest losing their investment in the venture.

- Inhibit quality participation since no weightage given for technologically superior products due to rigidity of QRs and final outcome being L1 based.

### Offsets

Defence Offset contracts worth approximately US\$ 4.7 billion were signed prior to the latest offset policy. These offsets have not achieved the primary objective of the policy which is to increase indigenous capabilities in defence sector, accelerate maturity of defence technological base, or create high quality jobs. A number of offset contracts are under CAG observation. An analysis of objections highlights lackadaisical attitude towards evaluation of offset proposals, lack of professionalism in contract formulation and inadequate experience in

the monitoring process. Majority of Indian Offset Partners (IOPs) are from the private sector, including MSMEs, who have no clue of long-term defence requirements. Nor are the foreign OEMs aware of where to invest and generate offset banking. This leads to disjointed investments which bring in no long-term manufacturing business and at times shady companies qualify as IOPs.

- Offsets is a specialist field that requires in-depth knowledge of industry, technology, international practices and manufacturing processes. At present DOMW appears to be inadequately staffed to carry out its assigned responsibilities and has no in-house expertise available on legal, financial and technical issues.

- Enhanced Inter Agency Coordination: Presently, foreign OEMs' efforts to form JVs with Indian partners are wearisome and rather discouraging. Based on priorities and long-term vision, the MoD should act as facilitator for better coordination amongst ministries to expedite formation of JVs.

- Prequalification and Publication of IOPs: Presently there is no practice to prequalify IOPs. If incorporated, it will assist OEMs to identify genuine IOPs in their offset proposals.

### Protectionist Policy

While indigenisation and self-reliance in the defence sector is the key to national security in the long-term, but the monopolistic domination by public sector till now has been a stumbling block in the absorption and incorporation of latest technologies as well as research and development in the country. A level playing field for the private sector is the need of the day and time lost so far will have to be made up by providing incentives in terms of funding for MSMEs and tax concessions. At the same time, the private industry will have to be sincere in its approach and give up selfish attitude to uphold the faith being reposed in it by the government.

### Defence Finance

It is generally believed that the LTIPP 2012-27 is based on the assumption that the defence budget would be approximately 3 per cent of GDP throughout the 15 year period. This has never happened and the defence budget for 2014-15 was only 1.74 per cent of the projected GDP. It appears that the capital acquisition plans are being prepared based on the perceived inescapable requirement, irrespective of the financial implication. Generally, the allocation for capital acquisitions is not fully utilised, but if the acquisitions begin to materialise as per LTIPP and the annual acquisition plan, then the defence budget would be inadequate and turn out to be the biggest stumbling block in capital procurements.

Another related issue is the lack of committed budgetary support to the defence capital acquisition plans. The 11th Defence Plan was never accorded 'approval in principle' by the government and, therefore, continued to lack committed budgetary support. Though the Defence Minister accorded approval in principle to the 12th Defence Plan (2012-17) after the then Army Chief wrote to him about hollowness in defence preparedness, it has not been

approved by the Cabinet Committee on Security so far. That means, it still has not been given committed budgetary support. In case, major purchases like multi-mission, medium-range combat aircraft, light helicopters and other cases materialise in a particular year, then the fund availability for initial payments itself may cause problems.

### Interaction

Interaction between the Industry and MoD, as well as Service HQs is infrequent, inadequate, restrained and unstructured. Lack of interaction results in irretrievable situations leading to avoidable delays and at times, foreclosure of schemes. Real time feedback on policies and procedures from non-government stakeholders can help in quick responses or resolution of ambiguous provisions or interpretations.


Most of the times, the bureaucracy at MoD has seemed willing to paralyse its own military procurement process in order to shield itself from the taint of corruption. Inaction, to protect oneself from taint of corruption, while taking decisions in national interest, cannot be condoned. Another aspect is 'black listing' of firms. While unethical business practices cannot be condoned, punitive actions need to be based on verifiable and established wrongdoing and not mere allegations stemming from affected adversaries.

### Implementation

The mere change of government, few statements and tinkering with policies will not result into faster acquisitions; the political and military leadership of the country must stop paying lip service and demonstrate the genuine will to implement the policies by establishing clear lines of accountability and providing solutions to unanswered questions or ambiguous policy provisions.

The overwhelming tendency of the concerned personnel at various departments of MoD, bureaucrats and Service Headquarters to 'play safe', 'push files irrespective of the outcome since results will be known 4-5 years down the line', 'bidding time' and finally 'no accountability' are the reasons for poor and inefficient implementation of the policies. While there is no single agency to be blamed but the plethora of agencies / departments within the MoD like controlling sections, Defence finance, DRDO, OFB, DPSUs, DGQA etc have to work in a coordinated manner to achieve desired results. Policies are only as good as their implementation.

### Conclusion

The policy decisions and other steps taken to facilitate defence acquisitions are constructive but there is a need to involve various stakeholders, especially those outside the government, in policy formulation by having a system of continuous feedback and taking action on it. Ensuring accountability and ruthless implementation with passion, which are sadly lacking, by all stakeholders can make the procurement process productive to raise the armed forces capability while boosting the indigenisation and self-reliance in defence sector. 



# DEFENCE BUDGET CURRENT AND NEXT

The shocking highlights of the report of the Parliamentary Standing Committee on Defence are: IAF is down to just 25 fighter squadrons against a sanctioned strength of 42; the situation was very grim and national security was being compromised; India may have already lost its strategic edge over Pakistan in terms of fighter squadrons; IAF requires at least 45 fighter squadrons to counter a two-front collusive China-Pakistan threat; India's fighter squadron strength will be reduced to just 11 squadrons by 2024; there are serious shortages of submarines in the Navy as well as equipment and weaponry for the Army.

When General Charles de Gaulle became President of France in 1959, France was militarily not very strong. Though France was the member of NATO, the Commander-in-Chief of the NATO forces was even prohibited from revealing to national authorities like the French President, which bases in their own countries housed the Alliance's nuclear weapons. What de Gaulle made sure was that the defence budget of France was to ensure defence allocations remained greater than 2 per cent and touching 5 per cent of the GDP, resulting in France emerging as a militarily strong nuclear power. That trend has continued with current French military expenditure standing at 5.4 per cent of the GDP. In India, though the Long-Term Integrated Procurement Plan (LTIPP) is based on a hypothetical 3 per cent of GDP, defence allocations have never really touched that mark. Even post the Kargil Conflict and public exposure to massive equipment shortages in the Army, the one-time high 1999-2000 defence budget allocation was made at 2.41 per cent of the GDP. However, there has been a downslide since then, not to talk of the thousands of crores of rupees that were surrendered by MoD annually barring an odd year when budgetary allocations were fully utilised.

## Insufficient Allocations

But how is the Defence Budget allocated and how is the LTIPP chalked out in absence of a National Security Strategy, without defining National Security Objectives and without a Comprehensive Defence Review. It appears pretty simple to bureaucrats manning MoD and equally to their political masters, latter dependent on bureaucratic advice which in any case is sans strategic sense. So the Services send up their demands, which are compiled by HQ Integrated Defence Staff and sent up to MoD for approval. Now take the current 2014-2015 Defence Budget standing at mere 1.78 per cent of the GDP. The Ministry of Industry and Commerce website states that 50 per cent of defence equipment held by our Army, Navy and Air Force is obsolete. Compare this with the projections versus allocations against capital expenditure by the

three Services in the current budget: Army projected a requirement of ₹ 41,936 crore but were allotted ₹ 26,533 crore; Navy projected a requirement of ₹ 28,253 crore but were allotted ₹ 22,804 crore though committed liabilities were already ₹ 4,599 crore; Air Force projected a requirement of ₹ 62,406 crore but were allotted ₹ 33,711 crore though committed liabilities were already ₹ 2,645 crore. The very first glance will tell you that the Army and the Air Force have been generally allocated 50 per cent of their projections while the Navy has been given the better largesse due to spate of accidents and state of the naval fleet. It does not matter if the IAF is down to 25 fighter squadrons against an authorised strength of 42 squadrons. After all the MoD is not accountable to the state of the Military in the first place, the Service Headquarters only being 'Attached Offices'.

## Shortfalls

The little flutter that the report submitted by the Parliamentary Standing Committee on Defence during the winter session of Parliament that ended on 23 December 2014 has been lost in the controversies of conversions, use of skull caps during mock drills and Pakistan denying cross-border firing and attempted terror attack by sea. That this report brought out that the Army is running low on ammunition, soldiers posted to freezing places like Siachen and Leh don't have boots

or mosquito nets and India has failed for over a decade to produce an assault rifle that meets the most basic requirements of the Army may also get lost as 'routine' considering the lack of follow-up on the leaked letter by the then Army Chief to the then Prime Minister two and a half years back. But though soldiers' lives may be of little consequence to some, figures mentioned in the report definitely should raise concerns. The committee found: Soldiers in high-altitude areas were short of nearly two lakh pairs of ankle leather boots; more than 13 lakh canvas boots were needed in same areas; one lakh mosquito nets were wanted; soldiers were waiting for 65,000 Balaclavas or masks to keep their faces warm; MoD had failed to furnish plausible information about how many soldiers have bulletproof jackets with voids jeopardising the lives of thousands of soldiers; and while MoD seemed satisfied that equipment like night vision goggles are plentiful, the Army was not satisfied with the state of affairs. The report says, "It appears that the Ministry is not taking the Army into confidence while doing its perspective planning." The report warns that the shortage of ammunition means "it would not be possible for the country to sustain a war for a longer period."

## Shocking Report

The committee report further brought out that the DRDO, tasked with developing technology for the military, has failed since 1982 to produce an acceptable INSAS rifle, the standard weapon of the Army. But that is not all and not only at the cutting edge troops alone. The shocking highlights of the report are: IAF is down to just 25 fighter squadrons against a sanctioned strength of 42; the situation was very grim and national security was being compromised; India may have already lost its strategic edge over Pakistan in terms of fighter squadrons; IAF requires at least 45 fighter squadrons to counter a two-front collusive China-Pakistan threat; India's fighter squadron strength will be reduced to just 11 squadrons by 2024; there are serious shortages of submarines in the Navy as well as equipment and weaponry for the Army; funding for the Mountain Strike Corps is inadequate (no funds allocated in current year) and it is being raised with only 'war wastage reserves'; inadequate number of bulletproof jackets is endangering lives of thousands of soldiers; crucial proposed defence procurements

linguishing could affect national security in big way – 37 cases of procurement are pending at 13 different pre-Contract Negotiation Committee (CNC) stages. Time taken at each stage is sufficiently more than what is accorded by DPP. With 27 cases lying at post CNC stages, 64 cases of capital procurements are pending; permitting important acquisitions to languish implies compromising national security; from defence expenditure at 2.41 per cent of GDP in 1999-2000, there has been continuous slide to the present 1.78 per cent of GDP; of the 14 conventional submarines of the Navy, most are over 20 years old, reaching the end of their service life. Eighteen more submarines are planned though existing force level is much less with most vintage and old. During the last 15 years only one submarine was inducted in July 2000 while five submarines were de-inducted; availability of battle tanks is very low while voids are also being filled with MBT Arjun and; after 14 years of development the INSAS rifle produced by DRDO was substandard.

To say that the report is a shocking indictment of the MoD, the DRDO and the procurement procedures for the military would be an understatement. It also focuses on complete lack of strategic thinking, strategic policy formulation and unaccountability and indifference on part of MoD towards the military and national security. But the more shocking part is that this atrocious state of affairs, as given in the report of the Parliamentary Committee for Defence, is continuing 29 months after the aforesaid letter written by the then Army Chief to the PM in March 2012. A major issue in the report is that of pending cases of procurement in various stages in the MoD, import of which may not have been understood at this stage. A former Vice Chief of Army Staff was told by a friend in MoD (Finance) that they actually have to submit a quarterly report as to how much funds they 'can' surrender at the end of the financial year for use elsewhere. Concurrent to the report highlighting the procurement delays, one assessment is that MoD may land up with surrendering ₹ 12,000 crore on 31 March 2015. That would be a cruel joke on the Services and the nation.

## US Example

In the US, a Congressional committee is given a presentation before budgetary allocations by Theatre Commanders about what is their current capability and if their budgetary demands are met what combat capacity will be achieved. We need to follow such procedure especially when the current 33-member Parliamentary Standing Committee on Defence is headed by a two star rank military veteran and not by a film star as was the case during the previous government. Considering the state of equipping our military it would be prudent to have a defence allocation of 2.5 to 3 per cent of the GDP for next few years till requisite capacity building is achieved. It is vital for the Defence Minister to ensure that no money from the Defence Budget is surrendered in the current financial year or in any subsequent one. The process of evolving a National Security Strategy followed by a Comprehensive Defence Review must also commence without further loss of time. **DSA**





new initiative

# DSA DIALOGUE

IDEAS THAT UNITE!

## An initiative of DSA

**Mission: Vasudhaiva Kutumbakam:** To endeavour to create "one world – one family"  
Maha Upanishad Chapter 6, Verse 72

**Vision:** To offer a global interactive platform for dialogue, debate and discussion to avoid confusion, contention and conflict for a safe and secure world of peace, harmony and prosperity.

The appreciation and applause received from the readers of Defence and Security Alert magazine from around the world have inspired the conception of "DSA Dialogue", an online interactive platform with the objective to develop a community which influences change and is value packed with analyses on paradigm shifts in defence, security, safety, surveillance and international relations. We envision **DSA Dialogue** as the most sought after forum for the defence, police and paramilitary forces, coast guards, intelligence agencies, corporates, think tanks, defence and security industry, airlines, hotels, critical infrastructure and establishments in India and around the world. **DSA Dialogue** is a daily pulpit to share your knowledge by discussing topics which resonate with global scenarios in defence, security and international relations.

### DSA DIALOGUE Focus Areas

- > Airlines
- > Banking and insurance
- > Border security
- > Corruption
- > Cyber terrorism
- > Cyber security
- > Defence budget
- > Defence forces
- > Defence industry
- > Defence policies
- > Drugs and human trafficking
- > Education
- > Environment
- > Entrepreneurship
- > Finance
- > Food
- > Fundamentalism and jihad
- > Future textiles
- > Geopolitics
- > Geostrategy
- > Healthcare
- > Hospitality industry
- > Intelligence
- > Insurgency
- > Internal security
- > Infrastructure
- > Plants and establishments
- > International relations
- > Innovation
- > Science and technology
- > Laws and policy
- > Maritime security
- > Military affairs
- > Migration
- > Money laundering
- > NATO
- > Naxalism
- > Politics
- > Police reforms
- > SCO
- > Security budget
- > Security and development
- > Security forces
- > Security industry
- > Social and political discord
- > Terrorism
- > Others

We invite experts and analysts from the entire spectrum of 'defence', 'security' and 'international relations' to initiate enthusiastic conversations and discussions that generate new ideas, unlock hidden insights, create an engrossing outlet of thoughts and make a difference for creating a more aware, safe and secure world for all of us and our coming generations. **DSA Dialogue** is a great way to get feedback on an idea that you want to develop further. Having a different view and some constructive criticism is invaluable in building a global recognition for your novel idea or unique perspective.

To know more please visit: [www.dsalert.org](http://www.dsalert.org) and start the dialogue now!

get connected



## DEFENCE AND SECURITY ALERT

The First and the Only ISO 9001:2008 Certified Defence and Security Magazine in India



# Subscribe Now!

You Pay

TENURE	COVER PRICE	DISCOUNTED PRICE	SHIPPING CHARGES			
			INDIA	DELHI / NCR	REST OF INDIA	DELHI / NCR
1 year	₹ 1440	₹ 1008	₹ 400	₹ 700	₹ 1408	₹ 1708
2 years	₹ 2880	₹ 1872	₹ 800	₹ 1400	₹ 2672	₹ 3272
3 years	₹ 4320	₹ 2592	₹ 1200	₹ 2100	₹ 3792	₹ 4692
<b>SAARC COUNTRIES</b>						
1 year	US\$ 240	US\$ 156	US DOLLARS	120	US DOLLARS	276
2 years	US\$ 480	US\$ 288	US DOLLARS	240	US DOLLARS	528
3 years	US\$ 720	US\$ 396	US DOLLARS	360	US DOLLARS	756
<b>REST OF THE WORLD</b>						
1 year	US\$ 300	US\$ 195	US DOLLARS	240	US DOLLARS	435
2 years	US\$ 600	US\$ 360	US DOLLARS	480	US DOLLARS	840
3 years	US\$ 900	US\$ 495	US DOLLARS	720	US DOLLARS	1215

I would like to subscribe to **DSA** for  1 Year  2 Years  3 Years

I would like to gift a subscription of **DSA** for  1 Year  2 Years  3 Years

Name (Self)..... Organisation .....

Billing Address..... City..... Pin code .....

Shipping Address.....City.....

State.....Pin code.....Tel.....Mob.....

E mail id.....

DD / Cheque No.....Dated.....Drawn on.....

for ₹ ..... in favour of **OCEAN MEDIA PRIVATE LIMITED**,  
Payable at New Delhi. **Please add ₹ 50 extra for all outstation cheques.**

#### Terms and Conditions

- Minimum subscription is for one year ie 12 issues. Your subscription will start with the next available issue after the receipt of your payment. **DSA** issues will be dispatched through Postal / Courier Services, as advised by the subscriber.
- Please forward the completed subscription form with all the required details. **DSA** will not be responsible for any theft, loss or delay once the magazine has been dispatched. Please mention your subscription ID in all your future communications with us.
- Please inform our subscription department about non-receipt of your copy latest by 20th day of the month, failing which the request for re-dispatch will not be entertained.
- Subscription prices can also be viewed at the following web link <http://www.dsalert.org/dsa-subscription/print-edition>
- Print and Online editions can be subscribed online through credit card via Payment Gateway.
- The terms and conditions may change without any prior notice. This offer is for new subscribers, valid from 1st April 2013.
- This subscription form supersedes all the previous. Please address all your subscription related queries through E-mail: [subscription@dsalert.org](mailto:subscription@dsalert.org) or call us at: +91-11-23243999, 23287999. Write to us at: Subscription department, Defence and Security Alert (DSA), Prabhat Prakashan Tower, 4/19 Asaf Ali Road, New Delhi - 110002 (INDIA).

For print edition login at: [www.dsalert.org/dsa-subscription/print-edition](http://www.dsalert.org/dsa-subscription/print-edition)  
For online edition login at: [www.dsalert.org/dsa-subscription/online-edition](http://www.dsalert.org/dsa-subscription/online-edition)





Save Trees, Secure Environment and Save Money!

# Subscribe to **DSA**™ Online

[www.dsalert.org](http://www.dsalert.org)

## Online Subscription

One Year

US\$ 30

Two Years

US\$ 35

Three Years

US\$ 45

**You may pay by Credit Card / Debit Card through Payment Gateway.**

\*Indian subscribers may pay in INR as per the prevailing conversion rates.

### You get

- Access to view and download the current issue.
- Access to **DSA** Archives, Blogs, Newsletters etc.
- Access to other information available only on the **DSA** website.

### You can

- Post your comments
- Subscribe to past issues
- Submit articles
- Participate in Quizzes, Competitions and Discussions etc

### To subscribe

Mail at: [subscription@dsalert.org](mailto:subscription@dsalert.org) or Call: +91 11 23243999, 23287999, +91 9958382999

Or write to Subscription Department, Defence and Security Alert, Prabhat Prakashan Tower,  
4/19 Asaf Ali Road, New Delhi - 110002, India

Or Login at:

<http://www.dsalert.org/dsa-subscription/online-edition>



# Are you a leader

in defence and security  
products and technologies ?

For Indian market

## Advertise in the leading Indian Defence and Security Magazine

THE ONLY INDIAN DEFENCE AND SECURITY MAGAZINE  
AVAILABLE ON INDIAN AIR FORCE (IAF) INTRANET



**DSA**<sup>TM</sup>

**DEFENCE AND SECURITY ALERT**

The FIRST and the Only ISO 9001:2008 CERTIFIED Magazine in India

**Prabhat Prakashan Tower**

4/19, Asaf Ali Road, New Delhi, India • [www.dsalert.org](http://www.dsalert.org), [info@dsalert.org](mailto:info@dsalert.org), [advt@dsalert.org](mailto:advt@dsalert.org)

To know about DSA focus areas, readership, global presence, circulation, distribution and rates etc please ask for our print and online edition media kits.



# Buy all past issues of



**DEFENCE AND SECURITY ALERT**  
An ISO 9001:2008 Certified Magazine

## From October 2009 to December 2013

### Most useful and research based content resource for:

- Defence and security personnel
- Research scholars
- Think tanks
- Defence and security institutions
- All libraries



**51**  
**Issues**  
**In**  
**One CD**

**for just ₹ 2000**

The First and The Only **ISO 9001:2008** Certified Defence and Security Magazine in India



### To order and to subscribe please contact our Sales Team

Mail to: [info@dsalert.org](mailto:info@dsalert.org)

or Call: +91-11-23243999, 23287999, + 91-9958382999