MANEKSHAW PAPER No. 42, 2013

Defence Acquisitions and Offsets
The Road Ahead

Karanpreet Kaur

Centre for Land Warfare Studies
New Delhi

KNOWLEDGE WORLD
KW Publishers Pvt Ltd
New Delhi

Editorial Team
Editor-in-Chief : Maj Gen Dhruv C Katoch SM, VSM (Retd)
Managing Editor : Ms Avantika Lal

Centre for Land Warfare Studies
RPSO Complex, Parade Road, Delhi Cantt, New Delhi 110010
Phone: +91.11.25691308 Fax: +91.11.25692347
email: landwarfare@gmail.com website: www.claws.in

The Centre for Land Warfare Studies (CLAWS), New Delhi, is an autonomous think tank dealing with national security and conceptual aspects of land warfare, including conventional and sub-conventional conflicts and terrorism. CLAWS conducts research that is futuristic in outlook and policy-oriented in approach.

Disclaimer: The contents of this paper are based on the analysis of materials accessed from open sources and are the personal views of the author. The contents, therefore, may not be quoted or cited as representing the views or policy of the Government of India, or Integrated Headquarters of MoD (Army), or the Centre for Land Warfare Studies.

www.kwpub.com

Published in India by

Kalpana Shukla
KW Publishers Pvt Ltd
4676/21, First Floor, Ansari Road, Daryaganj, New Delhi 110002
Phone: +91 11 23263498 / 43528107 email: knowledgeworld@vsnl.net • www.kwpub.com

Contents

Defence Acquisitions and Offsets
The Road Ahead

The nation relies on the technological superiority of its armed forces. It is our endeavour to ensure that the Indian armed forces always have the latest technology in our war-fighting systems which propel us towards achieving a technological edge over our adversaries. To do this, we must understand the needs of the defence forces. Fundamental to understanding those needs is an understanding of the strategic environment, existing now as also in the future, in which our armed forces operate/will operate.[1]

— Dr. Vijay Kelkar Committee Report (April 2005)

Introduction

A well established and fully functional defence industrial base is one of the major factors contributing to the rise of a country's influence, strength and security. India, in line with its geostrategic location in South Asia and proximity to the Indian Ocean, is set to play a major role on the world stage in the times to come. India's economic growth has afforded it the chance to develop a strong and stable national security structure in order to deter and defeat its adversaries, as also to achieve true power status. India needs to be operationally prepared to meet and overcome the challenges of conventional warfare, internal insurgency, terrorism and asymmetric threats from state and non-state actors. Increase in the capabilities and capacities of the armed forces will allow India to act as the net security provider in the South Asian region, which, in turn, will protect our critical national interests. Towards this end, the government has been evolving its policies and procedures to suit India's national strategic aims. In addition, the Defence Research and Development Organisation (DRDO), Ordnance Factory Boards (OFBs) and Defence Public Sector Undertakings (DPSUs) have been trying to fulfill their mandate to master the science of designing, developing and manufacturing cutting edge military technologies since the last 65 years. India has adopted numerous methodologies like licensed production, Transfer of Technology (ToT), Joint Ventures (JVs) and indigenous Research and Development

(R&D) to acquire and absorb critical defence technologies. However, the current state of affairs is lagging behind the envisaged goals of realising a sustainable indigenous defence manufacturing industry.

India's dream of achieving self-reliance in defence has been in the offing for a long time. India has been continuously striving to maintain stability internally as well as in its strategic neighbourhood, conduct military modernisation, induct and absorb world class defence technologies by the establishment of a robust defence industrial base. Despite efforts being made by all stakeholders, and the policies of the Government of India, the desires of the armed forces and expectations of the domestic industry are yet to be fulfilled. Even though the intent of policy-makers is forward looking and positive, the desired results have not been achieved. In order to achieve higher operational preparedness, the bottlenecks at the policy and implementation levels need to be addressed. Several factors like inordinate delays in modernisation projects, cost overruns, lack of strategic vision and synergy among stakeholders have posed challenges for the indigenisation drive. There seems to be serious disconnect between the planning and execution of programmes meant to achieve the ultimate objective of self-reliance and indigenisation in defence. Since indigenisation is a long process involving several years of R&D and production, the need to plug the operational gaps urgently calls for undertaking foreign acquisitions.

This paper analyses the existing defence acquisition process, the offset policy and the issues being faced by the stakeholders in its implementation. It also reviews the latest developments in defence offset deals and the recently revised procurement policy. The paper identifies the challenges of procurement procedures and related offsets policy. The endeavour is to propose solutions and recommend areas of improvement to make the acquisition process more efficient and effective.

Background

Defence production in India was first introduced in 1801 when the Gun Carriage Agency was established by the East India Company in Kolkata. Two hundred years later, the defence industrial base has expanded into a wide network of DPSUs, OFs and DRDO labs focussing on developing and producing military technologies, fostering an environment conducive to the creation of a pool of talented and highly skilled professionals in the

fields of science and technology. Since independence, strategic defence production in India has been entrusted to the public sector as outlined in the first industrial policy of the Industry Policy Resolution of 1948[2]. In order to develop strategic, complex and security sensitive systems for the armed forces, the DRDO[3] was formed in 1958 and some DPSUs were raised in the early Fifties to promote in-house manufacturing. Despite the policy driven objective of dedicated infrastructure and facilities for defence, India still relies on imports to meet more than 70 per cent of its defence requirements. Post-independence, India had limited security and infrastructure capability owing to dependency on the British and low levels of economic growth rate. Attempts were made to boost self-reliance in defence production through licensed manufacturing of defence equipment and establishment of DPSUs such as Bharat Electronics Limited (BEL), Hindustan Aeronautics Limited (HAL) and government owned shipyards.

The setback in the Sino-Indian War of 1962 made the government take notice of the grave situation and prompted a review of the country's national security set-up and indigenous capabilities. As a consequence, the Department of Defence Production under the Ministry of Defence (MoD) and the Department of Defence Research and Development were established in the early Sixties[4]. The accelerated modernisation of security infrastructure led to increased procurement of military equipment from the erstwhile Soviet Union as part of the 'Indo-Soviet Treaty of Peace, Friendship and Cooperation' of 1971. The dissolution of the Soviet Union in 1991 led to yet another shift in India's procurement strategy of defence equipment. India moved Westwards with a view to explore opportunities for business and partnerships in the defence domain. The decade of the 1990s witnessed economic reforms through the adoption of policies of Liberalisation, Privatisation and Globalisation (LPG) aimed at encouraging foreign investment in India in order to promote development of the domestic industry, with a focus on manufacturing. However, the Kargil conflict of 1999 exposed the state of equipment obsolescence in operational use by the defence forces of the country. The need for modernising the nation's armed forces and the creation of a strong and reliable defence industry was felt at all levels in the strategic and decision-making community. Based on the recommendations of the Group of Ministers (GoM) on reforming the national security system,

a new defence procurement structure and system was drafted within the Ministry of Defence (MoD) in 2001. The Defence Procurement Procedure DPP-2002, is a set of guidelines that attempts to classify defence acquisition programmes under several categories to accelerate modernisation, with priority being given to indigenous content. The primary objective of the DPP is to ensure expeditious procurement of the approved requirements of the armed forces, in terms of capabilities sought and timeframe prescribed by optimally utilising the allocated budgetary resources[5]. Subsequently, the Kelkar Committee was constituted by the Government of India (GoI) in 2004 to suggest changes in the acquisition procedures and enable greater participation of the private sector in defence production. The thrust of the Kelkar Committee report was "towards strengthening self-reliance in defence preparedness". The committee's proposals focussed on encouraging involvement of the country's domestic firms in defence capability building, pursuing an offsets policy to bring in state-of-the-art foreign technology and investment, exploring synergies amongst the private sector, DPSUs, OFs and DRDO to absorb high technology capabilities, and creating an environment for a quantum jump in export of defence equipment and services[6].

Though the LPG process commenced in India in 1991, the defence sector was insulated from the policy. The reform came in 2002 with the formulation of the DPP which allowed private sector participation in defence on a meaningful scale. It was believed that India's defence industry would greatly benefit from the entry of private players. However, this hope stands belied with the private industry finding it difficult to muster the confidence to undertake large scale defence projects. There is a mismatch between the government's intentions and the expectations of the Indian industry.

The defence offset policy was articulated within the DPP-2005 with the aim of promoting foreign investment through equity and infrastructure in the Indian defence sector. The industry on its part has been periodically providing feedback and suggestions for further refinement of the offset policy. As a result, amendments have been made in the policy on a regular basis which has provided hope that the objectives of self-reliance can be met in a meaningful timeframe.

Modernisation of the Defence Forces

> Technological superiority has to become the principal characteristic of our military advantage. Three important concerns will influence our choices for technology investments: leveraging the technology explosion, enabling the information based Revolution in Military Affairs (RMA) and asymmetric threats.[7]
>
> — Dr. Vijay Kelkar Committee Report (April 2005)

The 21st century is witnessing a technology driven transformation, with the nature of warfare fundamentally necessitating the use of 'state-of-the-art' equipment and weapon platforms to counter rapidly evolving security threats. The wars in Iraq and Afghanistan are indicative of the paradigm shift in war-fighting using modern technology. Defence technology is changing the face and nature of how wars are fought and won. There is a need to concentrate on those critical technologies that are important to the Indian armed forces for their modernisation requirements.[8] The following areas have been identified for the futuristic modernisation requirements of the Indian Army[9]:

- Battlefield Transparency.
- Combat Systems.
- Communication Systems.
- Rockets and Missiles Systems.
- Directed Energy Weapons.
- Advanced Material Technology.
- Artificial Intelligence.
- Robotics.
- Nano Technology.
- Bio-technology
- Non-Lethal Weapons.
- Combat Modeling and Simulation.
- Nuclear, Biological and Chemical Warfare Defence.

The government has taken several steps to promote the participation of private sector in defence production. These measures include opening up of the defence industry (since May 2001) for private sector participation (up

to 100 per cent) and Foreign Direct Investment (FDI) permissible up to 26 per cent or 49 per cent, subject to approval from the Cabinet Committee on Security (CCS) on a case to case basis; promulgation of Make and Buy, and Make (Indian) procedures; provision of offset obligations in all capital acquisitions categorised as 'Buy' (Global) and 'Buy and Make' with Transfer of Technology (ToT) where the estimated cost of the acquisition is INR 300 crore or more, and the Joint Venture (JV) policy for DPSUs.

The government formulated a Defence Production Policy (DPrP) in order to reduce dependence on the import of defence equipment from foreign countries. The Defence Production Policy came into effect from January, 2011.[10] The objectives of the policy are to achieve substantive self-reliance in the design, development and production of military equipment/ weapon systems/ platforms in the shortest timeframe possible; to create conditions conducive for the private industry to play an active role; to enhance the potential of Small and Medium Enterprises (SMEs) in indigenisation and to broaden the defence R&D base of the country. In order to synergise and enhance the national competence in producing state-of-the-art defence products and services within the government approved framework of budget and timelines, all viable approaches such as formation of consortia, joint ventures and public private partnerships, etc. will be undertaken. The academia, R&D institutions as well as technical and scientific organisations of repute will be made a part of the holistic defence production environment. The government will further simplify the procedures under the "Make" category of the DPP in such a manner that it enables the indigenous design and development of the required equipment/ weapon systems/ platforms by both public and private industry in a faster timeframe.[11]

Lately, new models have been adopted for involving the private industry in technology development to bolster indigenisation and achieve self-reliance in defence. In June 2012, the MoD flagged off India's first competitive development of a major military system, the Tactical Communications System (TCS) by involving the Indian public and private industry. TCS has become the first 'Make' programme under DPP, 2011. As per DPP, the 'Make' programme will have the government providing approximately 80 per cent of the funds for development and the rest will come from the industry. The Future Infantry Combat Vehicle (FICV) programme is another such example

where local Indian industry would be invited to develop the combat vehicles for the Army in collaboration with suitable foreign technology partners. This is a welcome change as it provides a level playing field for private and public enterprises, and encourages the private companies for greater participation in defence manufacturing. The mission and vision of such programmes is very positive and encouraging, but the real test is the execution of such initiatives. The outcome of such programmes is yet to be known as these are at a very nascent stage. The Indian Air Force (IAF) is also adopting a different model for indigenous development of aircraft through the private industry, rather than depending solely on HAL. Popularly known as the Avro model, it envisages the development of aircraft for replacement of 56 Avro transport aircraft under the aegis of a suitable consortia led by foreign/Indian private companies. The consortia formation approach and Public-Private Partnerships (PPP) are viable options to synergise and enhance national competence in producing state-of-the-art defence equipment. The success of the TCS, Avro replacement, FICV and Battlefield Management System (BMS) projects lies in understanding the dynamics of technology, project and personnel management and the business environment.

Defence Procurement Procedures

As part of the Kargil Review Committee's recommendations, new defence procurement management structures and systems were set up in the MoD in 2001. For operationalising the structures and systems, the DPP, 1992 was revised. DPP, 2002 came into effect on December 30, 2002. It was applicable for procurements flowing out of 'Buy' decisions of the Defence Acquisition Council (DAC). The scope of the procedure was enlarged in June 2003 to include procurements flowing out of 'Buy and Make' decisions. Since then, the DPP has been revised in 2003, 2005, 2006, 2008, 2011 and 2013. Inaugurating an International Seminar-cum-Exhibition on Naval Armament titled 'NAVARMS-2013' on January 31, 2013, Defence Minister Mr. AK Antony said, "The government has been keen to encourage the industry to realign its business processes for strategic alliances and joint ventures".[12] He said that the government is also encouraging the industry to step up the R&D efforts to remain globally competitive, especially in critical technology areas. The abovementioned statements indicate the level of seriousness

and focus of the government to implement and promote indigenisation. The introduction of the 'Buy and Make (Indian)' category, opening up of the defence industry to the Indian private sector (100 per cent) and FDI permissible up to 26 per cent are significant steps to enhance indigenisation. A note issued in July 2013 states that FDI up to 49 per cent is permissible in defence manufacturing subject to approval by CCS on a case to case basis. This decision is expected to bolster investment into India and is a positive step towards acquiring cutting edge defence technologies. It is envisaged that the industry will gradually assume the role of system integrator and manufacturer of complete defence equipment and systems.

In April 2013, the DAC approved major changes in the DPP to encourage the Indian defence industry. The refinements formulated after seeking the views of the stakeholders have been incorporated in DPP-2013 and have been made applicable with effect from June 01, 2013. The new procedures aim to balance the competing requirements of expediting capital procurement, developing a robust indigenous defence sector and conforming to the highest standards of transparency, probity and public accountability, while laying strong emphasis on promoting indigenisation and creating a level playing field for the Indian industry. In the foreword to the document, the Defence Minister Mr. AK Antony has expressed the hope that the defence industry as well as the procurement agencies will find DPP, 2013 to be a "progressive step" aimed at giving impetus to indigenisation, creating a level playing field between the private and public sectors, and expediting the procurement process as a whole. [13]

The highlights of the amendments in DPP-2013 are as follows:

- a specific order of categorisation with Buy (Indian) as topmost priority and Buy (Global) having least priority;
- release of a public version of the Long-Term Integrated Perspective Plan (LTIPP) for the industry to direct its infrastructural capabilities and investments accordingly;
- elimination of the clause of nomination for Maintenance ToT (MToT) thereby encouraging the private sector in Maintenance, Repair and Overhaul (MRO) work;
- clear definition of indigenous content;
- simplification of the complex "Buy and Make (Indian)" procedure;

- provision of funds for Micro, Small and Medium Enterprises (MSMEs) in the defence sector;
- freezing the Service Qualitative Requirements (SQRs) before the Acceptance of Necessity (AON) stage and reducing the AON validity from two years to one year;
- providing enhanced financial powers to the Service Chiefs and decision-making powers to the DAC;
- revision of the chapter on shipbuilding

The new offset guidelines which were announced in August 2012 have also been incorporated in the present volume.[14] With these changes, the new procedure is expected to provide the much needed thrust to the Indian defence industry while continuing to meet the military requirements of the nation to maintain operational readiness.

Defence Offset Policy

Offset practices in the global defence industry have been instrumental in influencing the defence related decision-making of several countries with varying results and degrees of success. Defence offsets encompass a variety of compensation arrangements mandated by foreign governments as a condition on the purchase of defence equipment, weapons and services. Often, the aim of the process is to even-up a country's balance of trade.[15] Offsets generally include technology transfer, foreign investments, joint ventures, co-development, and co-production, etc. with the aim of enhancing indigenous industrial growth. Countries use offsets to obtain critical military technology, to ease the burden of large defence purchases on their economy, to increase or preserve domestic employment and to promote targeted industrial sectors.

Offsets in the defence sector originated from the United States' (US) aerospace industry a couple of decades ago. The countries buying foreign military equipment desired to reduce their dependence on foreign companies by developing their indigenous defence industry. Cases in point are the offset programmes which were executed on account of F-16 international sales that benefitted the industry of the buyer countries. Generally, developing nations use offsets to develop their defence industries and to enhance their R&D,

and developed nations use these for joint ventures to share the costs and risks involved. Different countries have offset policies customised according to their security needs and developmental goals.

According to the Fact Sheet (April 2013) of the Stockholm International Peace Research Institute (SIPRI), India is among the top 10 countries in terms of military expenditure.[16] Every year, a significant amount of the defence budget is used for acquisition of military equipment through imports. Since independence, India has been importing the bulk of its military hardware from foreign nations. Though efforts were made to make India self-reliant in defence production through indigenous R&D, offsets did not figure in the preferred methods of indigenisation until lately. In India, the offsets policy was introduced in 2005 and since then, it has become an integral part of all major military procurement programmes. The first offset contract was signed for the purchase of medium power radars in 2007. The application of offsets against acquisitions in defence is a progressive step towards making India self-reliant. The MoD has shown openness in incorporating the views of the stakeholders and, hence, the policy is being revised on a regular basis.

Over the last two decades, offsets have become a common feature of major defence acquisitions all over the world, unleashed by the forces of liberalisation and globalisation. More than 100 countries have incorporated an official offset policy as a part of their foreign military procurement deals. Countries use various incentives like multipliers, offset banking, credits for R&D and ToT to attract foreign vendors. There is no particular template which suits the requirements of every country. A country needs to define the offset concepts and procedures in accordance with its specific aims and requirements.

The latest revised offset policy which has incorporated many progressive changes, came into effect from August 01, 2012[17]. After much speculation, the revised policy brought some clarity to the defence offset procedures while trying to strike a balance between the demands of the foreign Original Equipment Manufacturers (OEMs) and the interests of the domestic defence industry. The offset policy which began its journey in 2005 appears to have reached a sustainable degree of effective operationalisation. Former Minister of State for Defence, Mr. MM Pallam Raju, told the Parliament in August 2012

that Indian companies had signed 19 offset contracts with foreign vendors until mid-2012. IAF procurements generated 80 per cent of all offsets and naval procurements accounted for the other 20 per cent. Most of the Army procurement programmes have been below the value of INR 300 crore, on which offsets are not applicable. However, there are many big ticket deals in the pipeline where offsets will be utilised, and the Army has started working on them. The Army signed its first offset contract in March 2013 for thermal imaging integration for the BMP–II vehicles.

The latest amendments are aimed at making the entire procedure more transparent, efficient and effective. According to the new guidelines, the responsibility of defence offsets is divided between two organisations: the Defence Acquisition Council (DAC) will evaluate the offset proposals and finalise the contracts whereas the Department of Defence Production (DDP) will be responsible for implementation of offset contracts, including monitoring the progress of the contracts. A new formal organisation, the Defence Offset Management Wing (DOMW) was established under the DDP and has been assigned the responsibility of offset contract management. A similar organisation, the Defence Offset Facilitation Agency (DOFA) was established in 2006. However, it could not perform and deliver results as per the expectations. DOMW will have to carefully chalk out a clear charter of responsibilities as any ambiguity in the process will lead to underperformance and duty dereliction. The MoD officials opine that the new organisation will function through a fully automated system that will monitor, account for, and audit offsets in real time. If web-based online monitoring is implemented, it would be very beneficial for the government and the industry. However, the past experience of some online applications introduced by the government was not very pleasant. Therefore, it will need dedicated and sincere efforts by the officials of DOMW to manage the execution process efficiently. Of late, DOMW has been facing execution related challenges because of insufficient manpower, inadequate knowledge and experience in managing large scale offsets, vested interests of some officials, short tenures of officers and limited knowledge transfer.

The scope of discharge of offset obligations has been widened to include ToT. The provision of ToT as part of offsets is expected to immensely benefit the Indian defence industry. There have been such provisions for

ToT in earlier defence procurement programmes and the experiences of indigenous industry in absorbing and utilising the technology received from foreign Original Equipment Manufacturers (OEMs) have fallen short of expectations in the past. An example is the BEML-Tatra deal which was signed in 1986. It was learnt that despite the ToT agreement with Tatra, the indigenisation of the vehicles has remained far below satisfactory levels. Another instance is the Bofors artillery guns deal which was made two and a half decades ago with provisions of ToT included. Till date, the OFB has not been able to develop the homegrown version of a suitable artillery gun. Lack of technology absorption capability has been the main reason for non/under-utilisation of technology transferred from foreign sources. In cases where the home-made version of the equipment is inducted, the technology becomes obsolete. The need of the hour is absorbing technology, but more crucially, taking the endeavour forward through rigorous R&D. The foreign OEMs believe that India is not yet capable of absorbing the heavy flow of offsets through the ToT mode in high end technology. Though the ToT provision seems promising, there is no guarantee that India will be able to make full use of it, considering its inability to do so in the past.

Another notable amendment has been the introduction of multipliers wherein a multiplier value of 1.5 is permitted where MSMEs are chosen as Indian Offset Partners (IOPs), a multiplier of 2 is allotted when technology is offered to the Indian armed forces, 2.5 when technology offered is for both military and civil applications and 3 when technology is offered without any restrictions to export. A list of 15 specific high end technologies for acquisition by DRDO through offsets has been prepared.[18] However, an issue related to multipliers is that the technologies have been placed at par and there is no further grading with respect to their multiplier value based on criticality and other parameters. The current definition of multiplier values may not help India in gaining critical defence technologies. The foreign companies which invest considerably in R&D may not be comfortable in sharing those high end critical technologies with India at a multiplier value of as low as 2. There are no specific incentives to share high-end technologies and foreign OEMs can get the benefit of multipliers by sharing comparatively non-critical technologies

for the same multiplier value. The MoD needs to provide higher multiplier values to extremely critical technologies required by DRDO in order to attract foreign vendors. It may be helpful if MoD assigns multiplier values on a case to case basis, based on criticality, importance, requirement and urgency. With the current policy, certain OEMs might try to offer obsolete technologies which may have little relevance to the modernisation of the defence forces.

The Defence Minister and the MoD have been emphasising on the need for transparency and probity in defence procurement procedures. However, after signing about 20 offset deals so far, the status of most of the contracts is still not known. It is difficult to understand the rationale behind concealing the details and progress of offset contracts. In fact, the defence industry and OEMs should be made aware of the outcome of each project so that they can learn from the experiences of previous projects and take appropriate measures for future collaborations. This would also help the industry to understand the trends in offset projects and prepare accordingly in terms of infrastructure, investments and manpower acquisition. Other significant modifications in the revised offset policy include increasing the time for bank offset credits to seven years, extending the time duration for offsets' discharge by two years, Direct Foreign Investment (DFI) in 'kind', and limiting some penalties on vendors who fail to discharge offset obligations. These steps have been welcomed by the industry as they impart greater flexibility in business operations. The long standing demands of the foreign arms vendors have been incorporated in the policy, while simultaneously protecting the interests of the indigenous industry. However, some segments of the domestic industry have been apprehensive of the dilution of offset objectives and suspect that widening the scope of offsets may lead to digression from the original aim of self-reliance. Since the scope of offsets has been widened to include homeland/coastal security, civil aerospace products and services, etc., some analysts believe that even non-defence products and services would qualify for offset obligations. As a result, the foreign OEMs may resort to exploitation of these vulnerabilities to discharge offset obligations, which will be divergent to the foundational objective of establishing a home-grown defence industrial base.

The revised offset policy has incorporated a wide array of reforms addressing the concerns of the largest set of stakeholders, but with new changes arise new challenges. The MoD should keep the communication channels with the industry open to receive their feedback and recommendations periodically and to derive optimum gains from the offset projects. This will help the MoD to address the relevant issues and revise the policy accordingly in the future.

Offsets: Current Status and Issues

The procedure for implementing the offset provisions was included as Appendix D to DPP-2006. The offset clause is applicable for all capital acquisitions where the indicative cost is above INR 300 crore and the schemes are categorised as 'Buy (Global)' involving outright purchase from foreign/ Indian vendors and 'Buy and Make with ToT', i.e. purchase from foreign vendor followed by licensed production[19]. The IAF has taken the lead by signing the maximum number of offset contracts as a large portion of its purchases are big ticket deals. Offset contracts like those for the Medium Multi-Role Combat Aircraft (MMRCA) and heavy attack helicopter will be signed shortly. The Navy has been the leading Service in encouraging and successfully implementing indigenisation, particularly in its shipbuilding and submarine programmes. The Army has lagged behind in offsets as most of its contracts are below the stipulated value of INR 300 crore. However, after the signing of its first offset contract with Elbit Systems, Israel, for integration of thermal imaging sights on the BMP-II, the Army has entered the offsets domain.

According to reports, the total amount of offset contracts signed so far is roughly to the tune of $5 billion. With the emphasis on modernisation of the defence forces, the scope and value of offset contracts are expected to rise exponentially. Different stakeholders have differing opinions on the level of success of offsets to deliver on the key result areas of defence procurement. The report of the Comptroller and Auditor General (CAG) of November 2012 is the latest review on the subject, throwing light on the performance of offset projects.

The offset contracts of the Indian armed forces finalised till March 2013 are tabulated below[20]:

S. No	Procurement Programme	Offset Value (Approx)	Signed in	Status/ Offset Avenues*
1.	Medium Power Radars for Indian Air Force	$5.4 million	Oct 2007	Manufacturing contract to IOPs
2.	MiG-29 Upgrade for Indian Air Force	$308 million	Mar 2008	Simulator centre Manufacturing contract to IOPs
3.	Fleet tankers for Indian Navy	$55 million	Apr 2008	Manufacturing contract to IOPs
4.	Mi-17 V-5 Helicopters (MLH) for Indian Air Force	$405 million	Dec 2008	Training simulator Outsourcing from India
5.	P-8I Long Range Maritime Reconnaissance Anti-Submarine Warfare (LRMR ASW) aircraft for Indian Navy	$641 million	Jan 2009	Metallurgy and hydraulic lab facility Composite manufacturing tooling Friction stir welding Aero structures tools and processes Training
6.	Medium Altitude EO/IR Recce System for Jaguar aircraft for Indian Air Force	$21 million	Feb 2009	Not Known
7.	P-IV (HAROP) System for Indian Air Force	$44 million	Feb 2009	Not Known
8.	C-130 J-30 aircraft (Foreign Military Sales) for Indian Air Force	$219 million	Mar 2009	Training simulator Manufacturing contract to IOPs
9.	Fleet tanker under option clause for Indian Navy	$55 million	Mar 2009	Not Known
10.	Low Level Transportable Radar (LLTR) for Indian Air Force	$34 million	Jul 2009	Manufacturing contract to IOPs
11.	Air Route Surveillance Radar (ARSR) for Indian Navy	$11 million	Nov 2009	Not Known
12.	AW 101 VVIP Helicopters for Indian Air Force	$224 million	Feb 2010	On hold due to CBI scrutiny

13.	Unmanned Aerial Vehicles (UAVs) for Indian Navy	$80 million	Mar 2010	Manufacturing contract to IOPs
14.	CBU-105 Sensor Fused Weapons for Indian Air Force	$102 million	Nov 2010	Manufacturing contract to IOPs
15.	C-17 Globemaster aircraft (Foreign Military Sales) for Indian Air Force	$1.09 billion	Jun 2011	High Altitude Engine Test facility Transonic Wind Tunnel (TWT) Facility Training and Maintenance Defence strategic communication systems
16.	Mirage 2000 upgrade for Indian Air Force	$592 million	Jul 2011	Manufacturing contract to IOPs
17.	MICA IR and RF missiles for Mirage-2000 for Indian Air Force	$386 million	Jan 2012	Overhaul, upgrade and training
18.	New Generation Precision Guided Munitions (NGPGM) for Indian Air Force		2012	Not known
19.	Pilatus PC-7 basic trainer aircraft for Indian Air Force	$150 million	May 2012	Maintenance ToT to HAL Manufacturing contract to IOPs
20.	Integration of Thermal Imaging sights on BMP-II for Indian Army	$24 million	Mar 2013	Manufacturing contract to IOP Integration

* *These are some of the avenues offered by the vendors for discharge of offset obligations. The complete details are not known.*

Some of the offset contracts under negotiation and likely to be signed in the near future are as follows:

S. No.	**Procurement Programme**
1.	Medium Multi-Role Combat Aircraft (MMRCA) for Indian Air Force
2.	Medium Recce Helicopters for Indian Navy
3.	Heavy Attack Helicopter for Indian Air Force

4.	Medium Lift Helicopter for Indian Air Force
5.	Thermal Imaging Fire Control Systems (TIFCS) for T-72 upgrade for Indian Army
6.	M-777 Artillery Guns for Indian Army

The details of the status of offset contracts and the names of Indian offset partners are not available in the public domain. It would be beneficial if the MoD could provide accurate and detailed information about the status of offset contracts and the technology/capability received from each contract. Such information will help the stakeholders to carry out cost-benefit and Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. The stakeholders could apply mid-course corrections to ensure that the gaps between the stated and achieved objectives are minimised. The recent CAG report (audit scope – October 2011 to February 2012) that was tabled in Parliament in November 2012 indicated certain shortcomings in the offset contracts signed till mid-2012. The report highlighted that most of the offset contracts had not adhered completely to the DPP guidelines. The report also questioned the waivers given by the ministry to certain foreign vendors in fulfilling the offset obligations.[21]

As per DPP-2011, foreign OEMs can discharge their offset obligations only in the form of Foreign Direct Investment (FDI) in Indian Offset Partners (IOPs). Direct Foreign Investments (DFIs) in kind were not eligible offsets in the previous offset policy. The CAG team observed that in five offset contracts, equipment involving INR 3,410.49 crore had been directly provided by the foreign vendor as DFI in kind without any value addition through IOPs. The offset contract with Boeing for the C-17 Globemaster aircraft catered for establishment of the Transonic Wind Tunnel (TWT) test facility at DRDO in the form of DFI. As the TWT test facility was a DFI in kind, the offset was allowed by the DAC, even though it was not an eligible offset as per the prevailing offset policy. Similarly, against the offset contract with Boeing for procurement of P-8(I) aircraft for the Indian Navy, the OEM agreed to provide $153.90 million in the form of safety, reliability, composite manufacturing and hydraulic lab facilities, composite manufacturing assembly/ tooling, mobile broadband, friction stir welding and aero structures tools and processes. The DFI proposals relating to safety, reliability and airworthiness were not valid offsets as there was no value addition through the IOP.

The remaining metallurgy/hydraulic lab facilities, composite manufacturing assembly/tooling etc. were also a kind of direct import without any value addition. Since offsets are in a nascent stage and are evolving gradually, the likely pitfalls during the implementation process were not fully realised and catered for. However, there has been concerted effort to rectify most of the anomalies through the Defence Offset Guidelines of August 2012 which are expected to make the procedures implementable and practical.

The DAC had clarified in 2010 and 2011 that purchases of simulator services by the IOP from the foreign vendor would be eligible to the extent of value addition in India and investment in the simulator itself would not be recognised for offset credits. However, as per the CAG report, Boeing (C-17 Globemaster aircraft), Lockheed Martin (C-130J Hercules aircraft), Rosoboronexport (medium lift helicopters) and RAC MiG (upgrade of MiG-29 aircraft) had been claiming the supply of training simulators to IOPs towards discharge of their respective offset obligations. Since, the offset contracts were signed between the MoD and the OEMs, the MoD will have to justify the reasons for taking such decisions. The onus of providing clarifications on the observations of CAG lies with the MoD.

The government has allowed 100 per cent participation of the Indian private sector in defence, with FDI permissible up to 26 per cent. The CAG report also noticed that some companies having more than 26 per cent of foreign holding were accepted by the MoD as IOPs. For instance, for the contract of the MiG-29 upgrade, Prescient Systems and Technologies Private Limited was approved as the IOP despite the fact that it is a foreign company. For procurement of the Low Level Transportable Radar (LLTR), Thales International India (TII) was approved as the IOP, despite it being a 100 per cent subsidiary of Thales Singapore and Thales Hong Kong. In the offset contract for the procurement of fleet tankers for the Indian Navy, Wartsila India Limited and Johnson Pumps Limited were approved as IOPs despite being ineligible. The MoD needs to pay adequate attention during the signing of offset contracts with the OEMs in order to ensure that the existing guidelines are adhered to, and followed, in spirit and letter. Lack of relevant skills and experience is visible among the offset evaluation committee members as most of the offset contracts have not been implemented in line with the laid down norms and conditions. The MoD could work on the idea

of creating a special task force of professionals/experts from various fields such as defence economics, science and technology, trade and commerce, management, etc. which could evaluate the offset proposals and provide valuable feedback on the feasibility and benefits accruing from the offset contract.

The penalty provision of the DPP guidelines states that an amount of 5 per cent of the value of unfulfilled annual offset obligations is to be levied on the vendor in case of inability to fulfill contractual obligations. It has been observed that in two contracts, penalty charges of INR 3.06 crore on account of unfulfilled offset obligations had not been recovered from the defaulting vendors – Israel Aerospace Industries (IAI) for the Harop Systems (INR 2.04 crore) and Lockheed Martin for C-130J the Hercules aircraft (INR 1.02 crore). The findings of CAG might have come as a shock to the OEMs because they believed that they were in sync with the MoD to fulfill the offset obligations.

Stakeholders' Concerns

According to a study published by the SIPRI in March 2012, India became the largest importer of arms during the period 2007-11 and accounted for 10 per cent of global arms imports. This indicates that the hurdles to indigenous defence production at the policy, bureaucratic and implementation levels have to be ameliorated in order to catalyse and bolster domestic defence manufacturing to a level of qualitative and quantitative self-sufficiency. The government, the private industry and the users – all have their respective concerns relating to the acquisition procedures and the offset policy. In most of the cases, Staff Qualitative Requirements (SQRs) are formulated without proper analysis of technology availability, practicality of cost-timeframes and the manufacturer's capability. Major delays in procurement projects are related to irrational SQRs which either cannot be fulfilled or cause misunderstanding between the stakeholders. In a large set of cases, the Request for Proposal (RFP) is sent out, and months or even years later, it is are cancelled due to myriad reasons, resulting in losses to the public exchequer and detrimental effects on our national security. In December 2012, the Defence Ministry cancelled a tender for procuring 180 self-propelled wheeled artillery guns for the Army for the third time in a decade. The cancellation of the RFPs for 22

attack helicopters for the IAF, new engines for the Jaguar aircraft, 197 Light Utility Helicopters (LUH) for the Indian Army and multi-role helicopters for the Navy are some of the instances. Cancelling tenders has not only led to wasteful expenditure, but also resulted in capability voids which can be exploited by our adversaries to their advantage.

There are time delays and cost overruns in most of the projects – be it acquisition or in-house production. The slow pace of execution of defence programmes coupled with inadequate manufacturing orders from the OEMs has increased the level of frustration in the Indian defence industry. Defence PSUs and DRDO are also subject to the same set of malpractices. Some of the reasons given by the DRDO for delay in completion of projects are as follows[22]:

- *Ab-initio* development of state-of-the-art technologies.
- Non-availability of trained/skilled manpower in critical areas of science and technology.
- Non-availability of infrastructure/test facilities in the country.
- Technical/technological complexities of advanced defence systems.
- Non-availability of critical components/equipment/materials and denial of technologies by the advanced countries.
- Enhanced users' requirements or change in specifications during various phases of product or service development and induction.
- Increase/change in the scope of work at multiple times by various stakeholders.
- Extended/long-drawn user trials with high possibilities of rejection.

In the recent past, various scams in defence procurement deals have caused the blacklisting of many capable firms. This has further reduced the options for the defence forces to acquire cutting edge technologies from leading vendors of the world. The recent threat of blacklisting Finmeccanica in relation to allegations of bribery for the Agusta Westland VVIP helicopters has caused delays in procuring and inducting the much needed equipment. Though the scam does not directly affect India's defence capability, similar approaches in core defence deals would only delay the modernisation and transformation drive undertaken by India's armed forces. The foreign vendors complain about bureaucratic hassles and the complex business environment

of India resulting from long and rigid government procedures, thus, making it difficult for them to operate and conduct business in a conducive manner. The Japanese believe that there cannot be real security unless the country is independent with regard to technological knowledge and competence as well as self-sufficient in the production of armaments.[23] Sharing the same belief, India introduced the DPP-2011 which stipulates that preference is be given to indigenous design, development and manufacture of defence equipment. Therefore, whenever it is possible for the Indian industry to make the required arms, ammunition and equipment within the timelines required by the Services, the procurement should be made from indigenous sources.[24] However, the magnitude of indigenous production which is practically implementable is a matter of serious concern considering our limited manufacturing capabilities, infrastructure and human skill sets.

Eight years have passed since its inception, but the offset policy is yet to showcase the credible guarantee of its ability in establishment of a sustainable military-industrial complex. There have been apprehensions about the deliverability of offset projects and its efficacy to provide the desired results. The offset policy has been plagued by several obstacles. At the policy level, there are challenges of frequent changes in the policy, misinterpretation of policy, vested political and personal interests, lack of incentives for private industry and issues relating to taxes and industrial licensing.

The policy is in a nascent stage and is subject to repeat modifications and amendments. An ironical situation has risen where some stakeholders resist the changes in the policy due to the fear of dilution while others want further amendments to make it more business friendly. Hence, it is very difficult to follow a consensus-based approach in offset policy formulation. The participation of the domestic private industry has been thwarted by issues related to taxes and licensing. The innumerable taxes like service tax, customs duty, VAT, exchange rate variations, and the delays in obtaining industrial licences are major impediments that discourage the private sector from investing resources, capital and time in an uncertain environment. Limited incentives and public sector bias in defence restricts the realisation of the immense potential and expertise of the private sector which has been identified as a crucial partner by the DPP for its success.

Offsets comprise a complex subject requiring indepth understanding of

the intricacies associated with the concept. Lack of relevant experience and subject matter expertise renders the decision-making process ineffective. In addition, lack of accountability and transparency leads to a lackadaisical attitude on the part of the bureaucrats. To add to the woes, there is a problem of vested political and personal interests of various actors involved in the process. Inconsistencies among the various departmental policies and their interpretation results in uncertainty and misunderstanding of policy literature. As a result, there is lack of coordination among the stakeholders because of which consensus-based issue resolution is a challenge. The same can be aptly discerned from the observations made by the CAG report of 2012 wherein it was noted that several foreign vendors misunderstood the offset guidelines and even tried to manipulate the contracts to their advantage.

The most common and pressing challenge that needs to be addressed relates to time and cost overruns during the execution of offsets. The private industry lacks the relevant experience in large scale and complex defence production and has limited capability for high end technology absorption. The qualification criteria for military grade products are very stringent and the private companies are unable to visualise the quality requirements during the pre-contract stage. Another very critical issue relates to technology obsolescence. Electronics, being at the forefront of technology, is one of the worst affected and obsolescence prone fields. The contract execution timelines are so long that most of the offset contracts become unviable at the final stages of implementation due to out of date technology. The process of evaluation of ToT is judgmental and there are no stated sets of objective and scientific criteria to evaluate ToT proposals, which is a major drawback. The industry related issues pertain to misguidance by agents, misrepresentation of facts by the industry, unethical practices by domestic companies, unrealistic expectations by the Services and frustration due to delays which prevent the private industry from contributing meaningfully to India's defence growth cycle.

Recommendations

All the concerned stakeholders – the MoD, domestic industry, and users (armed forces)—have the same mission of setting up a robust and stable defence industrial base in India in a meaningful timeframe. However, what

is missing is an integrated vision and approach. The need of the hour is for the stakeholders to build a common platform based on trust, open two-way interaction and cooperation. The problems of irrational SQRs, unachievable technical parameters and frequent changes during the development phase need to be sorted out urgently. Continuous interaction with the vendors and inclusion of technical experts at the inception stage is needed to formulate pragmatic and deliverable SQRs. A robust system of accountability and probity needs to be put in place to deal with problems of time and cost overruns. Capability development in a timely manner based on thorough threat analysis enhances national security and the ability to project power to safeguard our national interests both within and without.

There is a limited number of organisations capable of delivering state-of-the-art defence products and services in the world market and even less are those vendors who are ready to part with critical technology, as mandated in the DPP. Out of the limited available options, blacklisting companies for every degree of fault is not the solution; rather, a credible penalty provision would be a pragmatic option. Every matter should be investigated thoroughly and the guilty should be punished by applying a range of penalties depending on the severity of misconduct, including imposition of financial penalties. Scrapping of the deal should be pursued in cases of proven severe and gross criminal conduct as the move has the capacity to adversely impact our military modernisation mission. Debarring the vendor should be the last option, to be used in exceptional cases after detailed investigations and in consultation with the Service Headquarters.

The 'Buy (India)' and 'Buy and Make' provisions in the DPP are aimed at encouraging the domestic industry to participate in defence production. The private companies need to foster the attitude of balancing the risks involved with the expected rate of return on investments and be more risk tolerant. However, the No Cost No Commitment (NCNC) trials are in conflict with the private industry's primary objective of making profits and, hence, discourage its participation in defence production. The government needs to act as a facilitator and incentivise the private sector for greater involvement in defence production. The successful examples of the US and Europe are indicators that the private sector can go much beyond only production into the domain of basic and applied R&D. An institution like the

Defence Advanced Research Projects Agency (DARPA) of the US could be formed in India funded by the government. The proposed body could carry out complex, investment intensive and fundamental defence related research independently and free from bureaucratic hassles. The successful template of the Information Technology (IT) model in India can be applied to private defence companies based on tax and duty exemptions in order to support their growth during the initial years.

Policies are vision documents containing a set of rules to achieve stated objectives and are limited in their ability to monitor and appraise the implementation progress. The focus on the execution of programmes is paramount as making changes on paper alone would not yield the desired results. Insufficient staff, lack of trained professionals and frequent changeover of the staff has created an environment of confusion and carelessness within the MoD. Defence acquisitions and offsets are specialised fields that require indepth knowledge of industry, technology, international best practices and manufacturing processes. Hence, subject matter experts who are well aware about the intricacies of the military requirements, offset procedures, military technology and can, therefore, take informed decisions congruent to the spirit of the policy, should be compulsorily made part of the evaluation and monitoring committees.

With ToT being entitled as an eligible alternative for discharging offset obligations, India can utilise the opportunity to acquire cutting edge technologies that it has not been able to develop in-house. The armed forces' responsibility as the end users is to enumerate the requirement of specific weapons, technologies and personnel as spelt out in the Long-Term Integrated Perspective Plan (LTIPP) 2012-27. A detailed review of the current policy procedures and the implementation processes needs to be carried out to incorporate best practices given in the GoM report and take corrective measures. The hope is that the reorganised DOMW and Acquisition Wing would draw appropriate lessons from past experiences and take the requisite measures to make the DPP a grand success.

The gaps in implementation of the procurement and offset policies need to be recognised and addressed at the earliest. It is essential to understand the concept of offsets and how leveraging offsets can benefit the economic and security aspects of the nation. There needs to be a forum where all

stakeholders can put forth their queries and views which are addressed in a time-based, accountable and transparent manner. Increased investment in R&D, human resource and infrastructure is the optimum solution to enhance technology development and absorption capability. Israel and South Korea are prime examples of nations which utilised offsets successfully to their advantage by rapidly moving up the value chain. The armed forces need to play an active role in the R&D and production stages to avoid miscommunication, misunderstanding, wastage and delays. CAG and other reputed audit agencies should periodically examine the offset contracts to identify loopholes and defaulters and help the concerned authorities take appropriate action. An effective and tamper-proof mechanism to ensure probity, accountability and transparency needs to be put in place.

The evaluation of the ToT mechanism has to be based on set criteria and technical parameters, with no room for ambiguity. Considering the defence budgets of our adversaries—China and Pakistan—a larger chunk of the Gross Domestic Product (GDP) needs to be allocated to defence to carry out its modernisation programmes that include acquisitions and in-house R&D and production. Additionally, academia and experts should be made part of the group entrusted with taking major decisions. DOMW needs to be strengthened, manned with appropriate human resource and empowered adequately for offsets to fructify. An understanding needs to be fostered among the key players that defence is a specialised field which requires expertise and technological aptitude. Blacklisting the foreign vendors in every instance is not the way forward as India needs the defence solutions and technology of world class firms. In a situation where our adversaries are undertaking massive military modernisation drives, India cannot afford to be complacent and needs to strive purposefully to secure its national interests.[25] The ambiguities in taxation, licensing regimes and export policies need to be ameliorated. The multiple and often contradictory policies need to be realigned to create synergies. The Indian industry's advantages in the form of cost competitiveness, a large talented pool of engineers and managers, manufacturing capabilities and IT resources need to be utilised by streamlining the regulations and policies into a seamless action plan.

The concerned authorities can learn from other countries' successful experiences and take appropriate steps to fulfill the primary goal of self-

reliance. India could study and benchmark the best practices of other countries like Malaysia, Israel, South Africa and Brazil which have successfully developed their defence industry by the application of many different models, including offsets. We need to understand that India requires targeting a specific set of critical technology areas for development instead of attempting to create everything indigenously. For example, Brazil imports 60 per cent of the components of the Embraer aircraft. It is a deliberate strategy to concentrate on producing critical technology rather than pursuing an unattainable goal of complete indigenisation. The offset policy is evolving and it is natural for it to face challenges. However, continuous efforts by the concerned authorities and stakeholders to synergise their actions will go a long way in making offsets a success story and creating a reliable and strong defence manufacturing base.

Conclusion

Defence procurements and offsets have been successfully used worldwide to promote indigenisation and there is no reason why India cannot fine tune its policies and processes to develop a credible defence industrial base. The possibility of India developing all the defence technologies indigenously is a utopian thought as can be inferred from the Defence Minister, Mr. AK Antony's remark, "I don't believe that there can be zero imports in defence, but we want to substantially reduce imports". The pragmatic approach towards fulfilling India's defence requirements would be to adopt a healthy amalgamation of indigenous development, ToT, JVs, offsets and, in some cases, technology acquisition. Several successful JV projects like the BrahMos could be emulated to produce a successful portfolio of defence projects. The consortia formation approach has its merits for developing and manufacturing defence technologies. The Public Private Partnership (PPP) model is an excellent way to synergise the core competencies of both the public and private sectors. The private defence industrial hub of SMEs that has sprung up around the cities of Bangalore, Hyderabad, Pune and Chennai has the capability to absorb and develop critical technologies given the right impetus in the desired direction. The potential of bigger private companies can be substantially harnessed if they are provided with incentives and a level playing field vis-à-vis government enterprises. The hurdles facing the Indian

private industry relating to industrial licences, customs duty, VAT, service taxes, foreign exchange variations and other bureaucratic roadblocks require quick resolution to maximise their participation and efficiency. The offset policy needs to be streamlined by bringing in greater clarity and business friendliness so to as to do justice to the promising idea. The DOMW needs to be restructured and revitalised to implement and monitor the offset policy efficiently by focussing primarily on human resource development.[26]

The efforts of the decision-makers to put in place unbiased rules will provide the much needed push to the private industry to deliver on its potential. It is time to analyse the global defence industry and emulate the successful examples by adapting them to India's particular needs, instead of blind experimentation. In the past, unplanned indigenisation without taking into account our capability and technology absorption capacity led to severe deficiencies and failed systems. Close synergy among the decision-makers, the technology developers and the users is required for the creation of a vibrant defence industrial base. This will ensure that the defence forces are capable of meeting future threats and challenges, thus, enabling them to maintain the security and sovereignty of the nation.

Notes

1. Dr. Vijay Kelkar Committee Report from website http://pib.nic.in/newsite/erelease.aspx?relid=8386
2. Pranab Mukherjee, http://pib.nic.in/newsite/erelease.aspx?relid=77313
   At the dawn of independence, the first Prime Minister of India, Pt. Jawaharlal Nehru had a vision that the public sector enterprises would herald the industrialisation in the country. Accordingly, he mapped out the strategy through the Industrial Policy Resolution of 1948 and 1956 that the public sector enterprises will lead the industrialisation process in the country as the private sector in India was weak at that point of time. In fact, the 1956 Industrial Policy Resolution specifically stated that the Public Sector Enterprises in India will attain the commanding heights of the economy.
3. "Genesis and Growth" from DRDO website http://drdo.gov.in/drdo/English/index.jsp?pg=genesis.jsp
4. http://mod.nic.in/aboutus/welcome.html
5. http://www.buylawsindia.com/DPP%20%282002%29.pdf
6. Press Information Bureau Release ID 8386 from website http://pib.nic.in/newsite/erelease.aspx?relid=8386
7. Dr. Vijay Kelkar Committee Report from website http://pib.nic.in/newsite/erelease.aspx?relid=8386
8. http://www.ciidefence.com/pdf/Future_Technology_Requirements_of_the%20Indian_Army.pdf
9. http://www.ciidefence.com/pdf/Future_Technology_Requirements_of_the%20Indian_Army.pdf

10. Press Information Bureau Release ID 81194 from website http://pib.nic.in/newsite/erelease.aspx?relid=81194
11. "Defence Production Policy 2011" from website http://mod.nic.in/dpm/DPP-POL.pdf
12. Press Information Bureau Release ID 91906 from website http://pib.nic.in/newsite/erelease.aspx?relid=91906
13. Press Information Bureau Press Release ID 96362 from website http://pib.nic.in/newsite/erelease.aspx?relid=96362
14. Press Information Bureau Releases from website http://pib.nic.in/newsite/erelease.aspx?relid=96362 and http://pib.nic.in/newsite/erelease.aspx?relid=96361; Defence Procurement Procedure 2013 from website http://mod.nic.in/dpm/DPP2013.pdf
15. "Offsets in Defense Trade", US Department of Commerce Bureau of Industry and Security, January 2012 from website http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/16th_offsets_defense_trade_report.pdf
16. SIPRI Fact Sheet, April 2013 , http://books.sipri.org/files/FS/SIPRIFS1304.pdf
17. Press Information Bureau Release ID 85665 from website http://pib.nic.in/newsite/erelease.aspx?relid=85665
18. http://drdo.gov.in/drdo/English/List_of_Critical.pdf
19. Extract of DPP (Para 22) from website mod.nic.in/dofa.htm
20. Karanpreet Kaur, "Indian Offset Contracts: An Evaluation" *Issue Brief No. 31*from website http://claws.in/administrator/uploaded_files/13572021131B%2031-26.12.2012.pdf
21. http://saiindia.gov.in/english/home/Our_Products/Audit_Report/Government_Wise/union_audit/recent_reports/union_compliance/2012_13/Defence/Report_17/Overview.pdf
22. Press Information Bureau Release ID 93863 from website http://pib.nic.in/newsite/erelease.aspx?relid=93863
23. Anuradha Mitra, "A Survey of Successful Offset Experiences Worldwide", *Journal of Defence Studies*, January 2009.
24. Defence Production Policy January 2011 from website mod.nic.in/dpm/DPP-POL.pdf
25. Karanpreet Kaur, "Hurdles in Defence Industrial Growth" from website http://claws.in/index.php?action=master&task=1338&u_id=184
26. Karanpreet Kaur, "Development of Critical Defence Technologies: The Way Forward" from website http://claws.in/index.php?action=master&task=1323&u_id=184