Centre for Land Warfare Studies (CLAWS)

National Seminar

On

Technological Sovereignty in ICT

11 Oct 12

<u>Executive Summary</u>

Overview:

The discussions on strategic implications of Information and Communication Technology (ICT) revolved around attaining technological sovereignty and indigenous development through combined partnership of public and private sector undertakings. The focal issue was India's heavy dependence in terms of imports of critical high-end equipment and software from foreign countries, particularly China. The lack of ownership over critical ICT technology can have serious ramifications for India's national security especially during times of conflict.

<u>Technical Session I: Strategic Implications</u>

Issues/Perspectives:

- In the information age, the bits and bytes are the currency of commerce and a national resource to be protected. ICT technology plays a critical role in assuring its availability and continuity

- Electronic and Cyber-enabled wars will in future present more options to leaderships of countries to wage silent and non-contact battles keeping in mind the sensitivities associated with conventional war in todays connected world

- India has suffered immensely in the past due to lack of ownership of technology in every critical sector of the economy. ICT is the future which forms the backbone of our economy, military and society

- The lack of net-centric enablement and secured information environment can adversely affect India's military operational readiness and performance in conflict scenario

- In defence production for low to medium end technology the lack of joint ventures, limited indigenous development through Licensed Production & Transfer of Technology, would lead to playing into the hands of few foreign vendors with strategic and commercial ramifications

- The international technology denial regimes in place are a key instrument in the developed countries' strategy to maintain world dominance

Recommendations/Proposals:

- There is an urgent need to establish the entire ecosystem to design and develop indigenous ICT technologies through adequate support from government

- A long term technology roadmap should be formulated by the government in consultation with the defence forces which can be used as a template by industry to develop critical high end technology

- There is a need to promote standards based ICT equipment and software for enhanced interoperability

- In order to mitigate vulnerabilities in India's national information and communication infrastructure, indigenous components should be given higher weightage formally through Defence Procurement Policy

- There is a need to augment the L-1 method in ICT procurement for security to include Quality cum Cost Based System (QCBS), T1, and T2.

- The role of ex-servicemen from the defence forces needs to be integrated in any indigenisation strategy as they are the people with the domain expertise and internal know-how of the defence services

Technical Session II: Stake Holders Concern in Military Technologies

Issues/Perspectives:

- India currently is an assembler and integrator of defence ICT solutions and severely lags in design and development areas

- The dominance of DPSU's in development of all major core military equipment in India has led to a situation of under-performance and inability to produce world standard products

- Hesitancy on the part of the private sector to participate in defence technologies including ICT due to lack of economies of scale and limited funding

- The Transfer of Technology regime is very restrictive in nature and if foreign support is withdrawn, availability and deployment is affected

- India's contribution in terms of design and development in ICT field is very minimal. This state of affairs is unsustainable and impinges heavily on India's national security

- Lack of trust between the private industry, defence forces and the government

Recommendations/Proposals:

- Optimum funding in R&D, creation of world class production and distribution facilities for ICT equipment

- The technology development strategy should involve identification of gaps, prioritisation of tech development, and use a healthy mix of ToT mechanisms, R&D and COTS solutions in a partnership mode with the industry

- The investments in R&D for core military technologies would lead to creation of more IPR which in turn would provide true ownership of the critical technology

- Patent core military tech, particularly in the field of ICT as it would help achieve the goal of self-reliance in its true sense

- The defence sector needs to be opened to private sector beginning with the non-critical technologies needed by the military followed by core critical requirements on successful performance

- Long term commitments for a broad based partnership are required to provide the requisite confidence to the industry to invest in R&D and manufacturing of critical defence technology and to move away from transaction based dealings

- Develop world class facilities and products so that export can compensate for the lack of economies of scale at home, and thus incentivising investment and participation

- The Buy (Indian), Buy & Make (Indian) and Make (Indian) projects should be given preference by the government in its defence procurements. The Make (Indian) projects are a new addition and should be the most incentivised

Technical Session III – Vision for the Future

Issues/Perspectives:

- Trust deficit between the stakeholders particularly the defence and private industry

- Systems are highly paper and manual intensive. Thus precious human resources are wasted to do mundane tasks, adversely affecting their primary responsibilities

- Complete dependence of defence forces on public sector is of concern to the private companies and lack of communication between industry and the services

- Clash between industry's and services' objectives – industry's aims centred on their balance sheets and the services aims to meet its operational requirements

Recommendations/Proposals:

- Need to revive industry – defence dialogue at the leadership levels

- Industry needs to know what ITC indigenisation is being done in the country and what is planned for future, for which future technologies will the PPP model be adopted, and standardisation of technologies across the three services

- An IT enabled environment needs to be created and capacity of the people in defence to absorb IT needs to be fostered. Emphasise on adopting IT transformation at the grass root levels

- MoD, being the most paper intensive entity needs to lead by example, by IT enabling its infrastructure. (Successful examples in Indian context are the banking sector and securities market)

- A change in the thinking and mind-set is required for technology adoption and assimilation particularly at the leadership and decision making levels

- Private Industry requires commitment in the form of Return on Investment (ROI). Assurance needs to be given to the private sector to save their interests through some sort of order commitment and level playing field

- A part of 30 per cent offsets in form of ToT should be mandated towards implementation

- Academia needs to be involved in the entire process

- A website can be made open to everybody where the requirements/RFI for defence procurements can be put up and anyone can propose a solution. Team 'Orlando' of USA can be used as a prototype model for participative R&D and production

- It was suggested that a practice prevalent in private industry on the lines of "reverse mentoring" could be adopted by the defence wherein young people who are technologically savvy can teach and support the seniors in making them tech savvy

Conclusion

The seminar helped to bring to focus the issue of indigenisation of all critical high-end ICT technologies adopting a collaborative and participative approach. The need to IT enable the defence forces was understood and adopted as an

important suggestion. The decision makers need to understand and adopt that shared investments and risks by government, defence and industry for new high end ICT technology development is the way forward. An understanding needs to be fostered that long lead times are involved in technology evolution and adoption. The GoI needs to provide support to start-up SMEs, preferably a few select as was the case with Qualcomm Corporation of USA. The government also needs to provide local market protection to SMEs so that they can thrive and flourish without the fear of being swept aside by big foreign players as well as domestic DPSUs.

CLAWS' Perspective

The seminar brought to fore the vulnerabilities in India's security architecture particularly in high-end technology. Although the theme of the seminar was focused on ICT, the same is applicable to other sectors which are dependent on critical, complex and state of the art technologies. The seminar helped to openly discuss the various issues bogging down indigenous development of core military technologies, particularly in the field of ICT. The seminar brought together all the relevant stakeholders who frankly discussed problems and solutions to help India achieve strategic and operational sovereignty.

CLAWS concurs with most of the relevant issues put forth during the course of the seminar. The need for indigenous development through R&D, IPR creation, provision for world class production and distribution facilities was at the heart of the issue plaguing India's over dependence on foreign countries specially China. Technology is not only an enabler but also a game changer for a developing country like India located in a very hostile neighbourhood. Electronic and Cyber Warfare are the future of how conflicts will be fought and will act as predecessors to the actual conventional campaigns. ICT forms the backbone of Information Warfare and thus, full management and control of these systems will provide unrelenting advantage over the adversary.

The participation of industry specifically the private sector is very crucial in this endeavour. The private industry has more innovative up to date solutions and is more efficient in delivering solutions particularly in the field of high end technology. There is a need to have extensive leadership engagements between the government, defence and industry. India needs to chart out a medium to long term technology roadmap which will act as a template for the industry to invest in and provide for the solutions required by our forces. The government needs to provide the requisite support to industry especially SMEs through funding and a

level playing field vis-a-vis the foreign and domestic defence companies. We, as citizens of India have an obligation to protect and preserve our sovereignty by all means.

The CLAWS National Seminar on "Technological Sovereignty in Information and Communications Technology (ICT)" was held on 11 Oct 2012 at Manekshaw Centre, New Delhi. After the inaugural session, the seminar was conducted in three sessions as under: -

(a)   **Session** 1. Strategic Implications.

(b)   **Session 2**. Stakeholders concern in Military Technologies

(c)   **Session 3.**Vision for the Future.

The seminar was attended by eminent members of the Armed Forces, Veterans, government officers, corporate sector, media think tanks and academia.It was conducted in joint collaboration with Centre for Land Warfare Studies (CLAWS), Centre for Digital Economy Policy (C-DEP) and Signals Directorate.

INAUGURAL SESSION

Welcome Address: Maj Gen (Retd) Dhruv C Katoch, SM, VSM, Officiating Director, CLAWS

It is my proud privilege to welcome you all to today's national seminar on Technological Sovereignty in Information and Communication Technology. I am particularly happy that we have been in a position to organise the same as the subject is one of critical importance. Paradoxically however, it does not get the attention it deserves. Information and communication technology impacts on each and every aspect of our lives, but more importantly, it impacts on all aspects of engagements in present day conflicts. With the passage of time, this facet will continue to assume ever increasing levels of importance.

In their influential work, War and Anti-War, Alvin and Heidi Toffler argued that the way nation states wage war reflects the way they conduct themselves economically in peace. In an earlier work, The Third Wave, Alvin Toffler argued that nation states historically develop through three stages, or 'waves'. First wave societies are largely agrarian in nature, the second wave is industrial and the third wave is post-industrial or 'informational' society. Agrarian societies wage war seasonally so that the farmer soldiers can return for the harvest. Industrial societies wage industrialised warfare with machine guns, tanks, battleships and bombers – suffering mass casualties (military and civilian). Informational societies for whom bits and bytes are now the currency of

commerce thus place greater emphasis on information as a weapons system. Across the world and also in India, we see these three different waves overlap simultaneously. The United States and other advanced societies with advanced military establishments are moving swiftly from the second to the third wave. In India, the level of advancement is at a much lower level and pace but as we move into informational war, the threats and challenges increase manifold. It is not an accident that the erstwhile industrial societies ruled over much of the world for centuries. In the information age, societies which control the levers of ICT will be ruling the rest of the world. I think it is important to understand that we cannot afford to be complacent on this score or else we will be subjected to a different sort of colonisation brought about by the loss of sovereignty in ICT.

It is a fact that today, the Chinese company ZTE follows only 20 to 30 per cent worldwide telecom norm and Huawei follows about 60 to 70 per cent worldwide telecom norm. This makes it very difficult to exactly track what backdoor/traps software these telecom companies have installed. If the backdoor software is in the firmware, it will be impossible to be aware of the same and remove it. The danger is that Indian telecom uses about 60 to 70 per cent of hardware and software from ZTE and Huawei. We are thus at great risk. This is just one example but more will follow in the course of the seminar.

Theme Address: Lt Gen SP Kochhar, AVSM, SM,VSM, ADC, SO-in-C

The criticality of maintaining sufficient levels of autonomy in ICT can't be underestimated and India's progress in this regard is the central theme of today's seminar. The issue of sovereignty in the field of ICT by India is not openly discussed due to various apprehensions and fears. ICT affects all walks of military and civilian life nowadays.

India aspires to be self-reliant in all the critical technologies and products. In the field of ICT, India at best is a system's integrator, and not a designer and manufacturer. India has a good track record in the services sector but when it comes to manufacturing there are serious lacunas in our preparedness. No genuine economy aspiring to be a power on the world stage can solely survive on the services sector. There is a dire need to bring in-house, the critical stages of designing and manufacturing ICT equipment. Today's friends can be tomorrow's enemies and therefore the urgent need to be self-reliant.

The major components of ICT are hardware, software, information and systems. The current scenario in India regarding ICT is one of assembly and integration. The situation is grave as assembly and integration neither provide self-reliance nor sovereignty over critical ICT technology. Sovereignty means maximum

control and autonomy over the ICT equipment and technology. There is only one way to achieve sovereignty in ICT and that is through indigenisation.

Some of the examples of ICT sovereignty in defence are:

(a)   Tactical Communication System.

(b)   Security and Network Computing Centre in collaboration with   C-DEP.

(c)   NIB- NSOC in Box.

To overcome the shortcomings there is an urgent need to bring in-house the expertise of designing and manufacturing ICT equipment along-with the associated software and security protocols. All stakeholders have to adapt quickly and overcome the resistance to change and perceived notions of each other. The effect quality and functional requirements have on technological sovereignty should also be a part of the decision matrix, rather than the L-1 system only. The role of ex-servicemen is also critical as they have the domain knowledge and the know-hows of the internal workings of the services which can be utilised by industry.

Key Note Address: Lt Gen Ramesh Halgali, AVSM, SM, DCOAS (IS&T)

ICT can be expanded to include the fields of Cyber and Electronics within its ambit. The strategic community of India needs to change its mindset from a defensive posture to an offensive orientation in lieu of the national security threats facing our country. The need of the hour is to urgently align the policies, organisation structures, operations and training with the emerging trends in ICT. ICT will be critical in India's pursuit of enhanced operational capabilities of its security forces. The main components of national power are economy, polity and the military.

The western nations dominate the international scene today as they had invested a lot of capital in technology historically. The technology denial regimes in place in the world today are the cornerstone of western nation's policy of maintaining supremacy. India needs to invest substantially in indigenisation of critical technologies to achieve self-reliance in its pursuit of global power status. The Chinese philosophy of asymmetric warfare through application of cyber-attacks and electronic warfare preceding the actual land campaign are geared towards reducing the enemy's advantage.

India needs to invest heavily in R&D, infrastructure development and robust industrial base. There is an urgent need to develop in-house Intellectual Property

(IP) and explore the Public-Private Partnership (PPP) models to overcome the pitfalls in our pursuit of technological sovereignty.

Vote of Thanks: Dr. Jaijit Bhattacharya, President C-DEP

A vote of thanks for their active participation and support in organising the seminar for Centre for Land Warfare Studies, Centre for Digital Economy Policy Research and Signals Directorate was delivered.

Technical Session I: Strategic Implications

Overview of Technological Sovereignty: Dr. Jaijit Bhattacharya, President C-DEP

The nature of warfare has shifted from a purely military exercise to a politico-military engagement with associated sensitivities. Nowadays, the leaderships of major powers around the world have options with them to neutralise the enemy's strategic and military assets. The conventional response requiring conventional capabilities of the military are no more the preferable option. ICT&C has opened up new doors of destroying an enemy's war-fighting capability without large scale collateral damage.

Another advantage of using ICT&C capabilities is the ability to effectively hide the identity of the attacker with minimum political fallouts. The case in study can be of Iran and the Stuxnet attacks on its nuclear facilities. The complexity of cyber enabled warfare needs to be seriously studied, particularly the threats of external origin with both internal and external abetment. The question that needs to be answered is how ready India is for information warfare? The cyber and electronic warfare will affect all critical components of our national infrastructure including banking, finance, health, IT, satellite & space and government.

The industry needs to provide the requisite solutions to all the above mentioned threats to support our military. The industry needs to put its best foot forward and provide the desired ICT solutions to make India more secure and strong. Some of the impediments facing the domestic industry are lack of Intellectual Property Rights (IPRs), absence of world standard designing and production facilities and insufficient government support. There is a practice of blocking new comers by usage of IPRs by established foreign players. To overcome the challenges of ownership in high end technology would be at the heart of achieving technological sovereignty.

Another major challenge would be the establishment of the whole eco-system to design and develop indigenous ICT technology. This would require considerable

investments in terms of capital, infrastructure, human resource and government policies. Lastly, there is a need to move away from the mindset of tenders and contracts to long-term roadmaps and partnerships.

Technologies for Securing Critical Information Infrastructure: Shri Shankar Aggarwal, Additional Secretary (A), MoD

At independence, territorial integrity was the paramount concern of policy and decision makers. The second issue of importance was the type of governance structure to be adopted for India which eventually culminated in the parliamentary democracy system. Other issues were the upholding of secularism and providing food security to its huge poor population.

The current situation requires a rapid adoption of modern science and technology to cure India of its ills and the ability to deliver public services timely (e-governance). Technology is a game changer and can provide the tools of reducing poverty and putting India on the path of high development growth. India is undergoing a rapid transformation of moving from a traditional economy to a knowledge based economy. Information and knowledge is being stored more and more in digital form. The ability to provide reliable and foolproof security to this digital information is a challenge for the government and other stakeholders. The lack of technological autonomy has serious ramifications for national security.

There has been a considerable shift in the nature of warfare to silent means of ICT&C engagements. The priority of government is to protect India's information infrastructure which is a critical sub-component of our national infrastructure. In India, the communication network is by and large under the private ownership. Some of the technologies on horizon that can provide effective security to digital communication are Terrestrial Trunk Radio, Satellite Communication, Software Defined Radio (SDR) and Distributed Computing.

March towards Net-Centric Enablement: Brig Harvijay Singh, DDG PMO Plan AREN

The ability to provide the right information to the right people at the right time in an actionable format would decide to a great degree the outcome of future conflicts. The nature of future threats would entail an agile response based on a secure information environment consisting of a reliable and robust communication and information infrastructure.

The key enablers of network centric warfare are:-

(a) Physical and information infra.

(b) Seamless networks.

(c) Tactical Communication System (TCS).

(d) Battle-field mobility.

(e) Spectrum and Bandwidth availability.

(f) Secrecy.

(g) Knowledge (Human Resource).

The set of challenges in the tactical domain are one of the hardest to deal with as nearly all the assets are mobile and there is a great degree of ad-hoc network proliferation. The moving of information is more cost effective as compared to moving of men and equipment in time and space. Therefore, a robust tactical communication network which provides connectivity on the move would provide the Indian forces with an advantage vis-à-vis its adversaries. It is the combination of firepower, lethality, precision, range, armour, morale and communication which is at the heart of any modern day defence force.

In the 21st century it is not only the transportation highways that will provide mobility to armies around the world but more importantly the information highways. The mobility of nodes as well as base stations in theaters of war has become a necessity for operational success. The mobile platforms will have to be linked to satellites which in turn will connect with base stations to provide communication on the move. One of the successful examples of indigenisation of technology in the Tactical Communication domain is the development of Aggregator by the Indian Army's Corps of Signals. The Aggregator combines the various communication protocols such as GSM, CDMA, Wi-Max and CNR to provide the field soldier with seamless communication with the press of a single button.

Assured communication anywhere without the help of fixed infrastructure and zero setup time requires large spectrum availability. There is a proposal to identify and create Defence Interest Zones (DIZ) covering the whole periphery of India including maritime borders where the defence will have sole authority over the spectrum. The goals of Network Centric Enablement are:

(a) Standards based approach.

(b) Convert to packet switched IP networks.

(c)   Full use of legacy, COTS and modular technologies.

(d)   Build a little, test a little, demonstrate capability.

(e)   Interoperability .

(f)   Innovative indigenous designs

Implications on Acquisition Policy: Maj Gen Atul Mehra, ADG Telecom

The Indian demand for ICTEC equipment will see a huge surge in the coming years with the predicted demand standing at Rs 1,70,091 crore in 2020 compared to Rs 76,940 crore in 2012. This is a rise of more than double our current demand in just an eight year period. The lion's share of the demand for ICTEC will be for the wireless equipment which will represent close to 60 percent of the total value by 2020. There is an urgent need to reduce our dependence on foreign players in the critical field of ICTEC considering the phenomenal growth the sector will witness in the coming decade.

The manifestation of sovereignty in ICTEC will depend on the trustworthiness of the equipment being imported for sanitisation. In times of conflict, the ownership of these ICTEC assets will be crucial to the final outcome. The strategic control over ICTEC would be through ownership of design specifications, IPR and source-code. This will provide full control and independence to the decision makers. Another major facet is the promise of assured supplies at all times without slippages or conditions during times of crises. There needs to be a concerted effort to build requisite capacity in terms of design, production and supply of ICT&C equipment. This will in the long run lead to decreased geographical vulnerabilities and economic security of our nation.

The domestic industry has fallen short of expectations in the above mentioned needs. The ability to design and produce critical ICT&C equipment has not been forthcoming resulting in India's heavy dependence on foreign suppliers particularly a few small set of countries that can hold India to ransom during times of crisis. The domestic industry needs to be supported and promoted by the government, MoD and the defence forces in developing the requisite capabilities and capacities. The MoD and defence forces need to chart out a long term roadmap for critical technologies they wish to possess and provide the industry with R&D budgets and some sort of order commitments.

In India the defence policy includes a mixture of Buy, Buy & Make and Make projects in pursuit of timely modernisation. Some of the major drawbacks of defence acquisition policy are:

(a) Indigenous component given as percent of total cost of equipment.

(b) Percentages applicable to all categories of procurement; not ICTspecific.

(c) Sub-components contributing to indigenous cost not specified; thus non critical items such as power, clothing etc can form the indigenous part.

(d) No weightage for technically better products. L-1 remains the major criteria

Some initiatives have been taken by the Government of India (GoI) to remedy the state of affairs. One of them is the announcement of National Telecom Policy 2012 which gives Preferential Market Access (PMA) to domestic ICT&C companies in government purchases, and provides for the creation of full eco-system to promote R&D, design, IPR creation, testing, manufacturing and standardisation of the complete value chain of domestic telecommunication sector.

Some of the recommendations particularly in terms of defence acquisition were to promote Quality cum Cost Based Solutions (QCBS) with higher weightage to indigenous components during times of procurement. The definition of indigenous components should be made explicit to include critical technologies such as Operating Systems, Protocol Stack, Embedded Software etc. There needs to be a contractual obligation to provide for supply chain sanitisation. Priority and preference should be given to Make, Buy and Make (Indian) and Buy (Indian) projects whenever possible. Another area of cooperation that can be explored is the formation of Joint Interest Groups (JIGs) between industry, defence and academia. The vast pool of ex-servicemen can be harnessed to derive the domain knowledge by industry in their pursuit of providing indigenous solutions to the military.

Discussion: Technical Session I

The ideas discussed related to the application of cognitive computing and newer technologies on the ICT horizon. There was exchange of data on current R&D projects in India in the ICT domain. The industry particularly SMEs identified lack of funds and the participative research models as major impediments. The idea of managing risks associated with new technologies was also put forward as compared to the play safe policy. Another major issue raised was the inability of MoD to define software as a product and the related problems that are faced by software industry.

There was a broad based consensus that application of L-1 methodology to all purchases of the defence is not beneficial. The lack of investment in telecom manufacturing was also raised. Another issue that was brought to the fore was the difference between DPP and DPM for calculation of L-1 based on inclusion of taxes.

Technical Session II: Stake Holders Concern in Military Technologies

The second session focused on the various concerns of stake holders including the defence, government, industry both private and public and academia, on issues of military technology development in India. The session was moderated by Dr. Jaijit Bhattacharya, President C-DEP.

Core Technologies Impacting Modern Warfare: Lt Gen Philip Campose, VSM, DG PP

The battles of future would be considerably different from that of the last decade. The main features would include massive use of precision guided munitions, deep strike capability to hit enemy command and control structures, rapidly changing battlefield scenarios and real time availability of battle damage assessment. Some of the core technologies that will act as force multipliers are:

(a)   Artificial Intelligence and robotics.

(b)   Missiles and BMD.

(c)   Space technology.

(d)   Information and Communication Technology (ICT).

(e)   Nano Tech and Bio-Tech.

ICT will play an unprecedented role in enhancing our war-fighting capability. ICT dominance not only gives advantage in the conventional battle scenario but also provides the option of non-contact battle with minimal collateral damage but significant deterioration of enemy's strategic assets. Some of the critical Info-tech are seamless and robust networks, single point interface for the warfighter, high performance computing components and autonomous software driven systems.

The information warfare domain will predominantly include cyber and electronic engagements. The race would be of dominance of information and electromagnetic space in times of conflict. The usage of technology to act as force multipliers will include impact on doctrine, organisation and training structure.The technology development strategy would involve identification of

gaps, prioritisation of tech development, and use of ToT mechanisms, R&D and COTS solutions to develop new technology. Some of the futuristic technologies on the horizon are directed energy weapons, CRBN protection, unattended ground sensors, anti UAV and antisatellite weapons.

Investments in R&D on Core Military Technologies: ShriSatish K Kaura, Chairman CII Defence Committee

The investments in R&D for core military technologies would lead to creation of more IPR which in turn would provide ownership of the critical technology. The ability to patent core military tech, particularly in the field of ICT would help achieve the goal of self-reliance in its true sense. Currently, the Transfer of Technology (ToT) route is most widely used to design and develop core high end technologies   . The dominance of DPSU's in development of all major equipment in India has led to a situation of under-performance and inability to produce world standard products. The sector needs to be opened to private sector with first the non-critical core technologies needed by the military followed by core critical requirements on successful performance. In the meantime, DRDO will have to take the lead in design and development of core military needs.

One of the areas where private industry can play an important role is the replacement, spares and maintenance aspect of military equipment.The issue arises due to the small scale of demand market from a small set of customers including the MoD and MHA. The economies of scale that are crucial for product development and production are lacking and thus, long term commitments for a broad based partnership are required to provide the requisite confidence to the industry to invest in R&D and manufacturing of critical defence technology. Another solution is to develop world class facilities and products so that export can compensate for the lack of economies of scale at home, and thus incentivising investment.

Sustainable Business Models for Private Sector Participation- From Government Perspective: Shri RK Mathur, Secretary (Defence Production)

The government recognises the imperative need of involving private sector in the defence production sector. The RakshaMantri has openly stated his support to private sector participation and is working diligently on providing the optimum environment for the private industry to thrive and flourish in the defence sector. The national power of India is a sum of all the various facets of society and industry including the government, academia, economy, defence, PSU & DPSUs, private industry and society as a whole.

The intention to involve private industry has been made official and clear in the formulation of our Defence Procurement Procedures (DPP) with the current one being the most amiable and understanding of private sector concerns. The licensing policy allows 100 percent domestic private industry participation with a cap of 26 percent on FDI in defence. The scope for private sector participation is immense as present offsets are to the tune of Rs 18,000 crore, with estimated Rs 80,000 crore of projects in the pipeline. The Buy (Indian), Buy & Make (Indian) and Make (Indian) projects are being given preference by the government in its defence procurements. The Make (Indian) projects are a new addition and are the most incentivised. The process involves bringing out a domestic tender which would select only domestic private players for the contract. Some successful examples of Make (Indian) projects are Tactical Communication System (TCS) and NSOC.

The DPP is also in the process of being updated to include a private sector version for long term policy for procurements. The OFBs and ammunition factories have been given permissions to form Joint Ventures (JVs) with private organisations. The OFB has taken on itself to produce a 155mm artillery gun which could see trials somewhere in 2013. The dependence on imports has led to a condition where the end user presents the best specs for a particular product whether it serves the need or not. The ToT regime is very restrictive in nature and if foreign support is withdrawn, it is very hard to find replacements. Private industry should take heart from the fact that thousands of SMEs are already involved in defence production mainly in the non-critical field.

Sustainable Business Models for Private Sector Participation- From Perspective of Managed Service Provider: Shri Milan Rao, CEO Enterprise Business, Bharti Airtel

Some of the major factors which can support IPR creation, investments in R&D and complete indigenisation of solutions are as follows:

    (a)   Optimum utilisation of resources, particularly capital investments.

    (b)   Leveraging civilian technology to deliver military capability.

    (c)   Move away from reliance from a select group of R&D institutions with majority being DPSUs and DRDO type organisations.

    (d)   Risk-Reward mechanism to stimulate innovation.

    (e)   Balanced approach to interoperability Vs. proprietary technology.

    (f)   Shared investments and risks by government, defence and industry.

(g)   Understanding that long lead times are involved in technology evolution and adoption.

(h)   Move to strategic partnerships from transaction based dealings.

(j)   Provide some sort of ROI guarantee.

Some of the solutions that can be provided by the managed service industry include secure CUG communication, secure access through mobile, tracking and location identification, dedicated service delivery through application store, data centres, hybrid cloud model, accreditation and audit of IT infra and setting up of centres of excellence.

Sustainable Business Models for Private Sector Participation- From Perspective of ICT Infrastructure Provider: Mr. Rajiv Mehrotra, CMD ShyamVihaan Ltd

India is the 2nd largest consumer of high end technology in ICT in the world. India's contribution in terms of design and development in ICT field is nearly zero. This state of affairs is unsustainable and impinges heavily on India's national security. Globally, the number of consumers is nearly 4 billion which presents a viable case of investment and production of high end technology in ICT in the civilian sector. The massive investment is justified by the presence of a large market. The private sector understands that technology is a high risk business involving long lead times in terms of ROI.

The industry also understands that nothing can work without the support of the government, particularly for the SMEs. One of the global success stories is Qualcommwhich due to government support and preference has now become a world leader in the ICT field.The GoI needs to understand this and provide support to startup SMEs, preferably a few select. The government also needs to provide local market protection so that SMEs can thrive and flourish without the fear of being swept aside by big foreign players. There needs to be an understanding that copying is not always bad and re-inventing the wheel all the time is not always beneficial.

Some of the ICT technologies which can be provided by SMEs are unattended ground sensors, security cameras, Aerostats, mobile telephony and encryption systems.The L-1 business has to go and a healthy balance of QCBS and L-1 has to be implemented. One interesting case in point is that countries like Greece, Spain and Italy are in a big financial mess whereas countries like Germany, Finland and Norway which have ownership of Siemens, Nokia and Telenor corporations respectively are much healthier. Do these countries in the

North Europe know something which their Southern neighbors don't or is it a case of information dominance?

The SMEs need funding as they lack huge reservoirs of capital and some sort of order commitment so as to invest in risky high end ICT technologies.The government on its part has to decide which companies to support as the space in ICT field is very limited.

Discussion: Technical Session II

There is a need to create separate lists for large corporations and SMEsfor production of various defence solutions. There is a huge opportunity particularly for SMEs to operate in the non-critical defence production sector and provide in-house solutions which will eventually lead to operational sovereignty for the armed forces. An understanding needs to be developed regarding sharing of risks and investments among the various stakeholders particularly the government, defence establishment and industry. The defence community needs to understand that high end technology is a risky business and things may not always turn out to be successful, but participative and partnership approach to R&D and production is essential.The industry needs to have some sort of order assurance from the defence regarding the solution the industry will be providing on successful completion.

Technical Session III: Vision for the Future

The third and final session focused on the future vision that the various stakeholders envisage to provide India with technological and operational sovereignty particularly in the field of ICT. The session was moderated by Maj Gen Dhruv C Katoch, SM, VSM (Retd). The speaker panel consisted of Lt Gen SP Kochhar (AVSM, SM, VSM, ADC, SO-in-C), Shri Vijay Kumar (Senior VP-Mahindra & Mahindra), Shri Tanmoy Chakrabarty (VP, Government Vertical, TCS), Shri Sushil Aggarwal (Head of Government and Defence Group, Infosys) and Shri Rajiv Mehrotra (Chairman & MD, Shyam Vihaan Ltd).

Introductory Remarks by the Chair: Maj Gen (Retd) Dhruv C Katoch, SM, VSM, Additional Director, CLAWS

The Chairperson pointed out the major impediments in the process of military modernisation and stated that the problem is not just technology gaps, but also generation gaps. He highlighted the fact that most of the technologically affluent people are in the 15-30 year age group while the decision makers are in the above 50 year age bracket. So, a gap is seen in terms of generation as well as knowledge of technology. The people who have knowledge are young and those

who take decisions are generally not tech savvy. As a result, some of them are not aware of what is required and what needs to be done.

Gen Katoch discussed that each of the three players - the defence forces, the decision makers in the government and the industry are highly motivated, patriotic and raring to get ahead faster. Despite all three having similar ends, somehow the goals have not been realised because of lack of trust between the stakeholders. The trust deficit is a major hindrance to the process of achieving technological sovereignty in ICT.

Mr. Vijay Kumar, Senior Vice President, Mahindra & Mahindra

Mr. Vijay Kumar talked about the 1990 Gulf War when US forces invaded Kuwait. The software that was used in the bombers was developed in late 1960s and early 1970s. He then brought to light the progress of Indian IT industry in the last few decades and specified the reasons for the transition, namely because of English language pervasiveness as a communication medium and the innate mathematics logic that Indians possess. In early 1980s, nobody in the world recognised India's capability in the field of Information Technology. But today, the world looks up to India for world class IT solutions, meanwhile also looking forward to the next wave of IT innovations of which India will be the source. Mr. Kumar then talked about how Mahindra & Mahindra is involved in the data analytics part of Business Intelligence for the Future Infantry Combat Vehicles (FICV) programme and how the company intends to play greater roles in the defence sector, particularly in IT.

Mr. Tanmoy Chakraborty, Vice President, Government Vertical, TCS

Mr. Chakraborty recalled the IT Task Force that was set up by the Chief of Army Staff a couple of years ago. He emphasised on the need for revival of the industry – defence dialogue at the highest levels for meaningful collaboration between the two parties. He talked about the $70 billion IT industry in India with skills unmatched to anywhere else in the world. Still, the track record has been that the corporate decision makers pursue companies around the world while missing out on the domestic sector. The time has come to look inwards and openly embrace, dialogue and partner with the indigenous customers including the defence. The private IT companies, the PSUs, MoD and the three services need to come together in an integrated eco-system so as to help the industry accelerate, and to help bring private players at par with the foreign leaders in technology development.

There is a need to re-engage at the leadership level of the defence forces. The systems that have been left as the legacy of the British are highly paper and manual intensive. These legacy systems need to be discarded and an IT enabled environment needs to be created. Mr. Chakraborty highlighted the transformation of the banking industry and the securities market from a paper intensive system to a completely IT intensive regime. He emphasised the need to modify the existing systems and adopt the IT transformation at the grass root level. He also indicated how the capacity of the people to absorb IT needs to be fostered which in turn will throw open the pull factor of IT rather than push, as is the case at present. Mr. Chakraborty suggested that the MoD, being the most paper intensive entity, should lead by example by IT enabling its infrastructure. There has to be a change in the thinking and mindset of people. Technology needs to be used at work to improve performance and productivity. He indicated that because of manual intensive operations, human resources in defence are wasted in doing mundane tasks, which could rather be involved in protecting the borders of the country. In conclusion, it was suggested that an IT enabled environment needs to be created and the mindset of the leadership needs to change for the transformation to take place.

Mr. Sushil Agarwal, Head of Government and Defence Group, Infosys

Mr. Agarwal talked about the private industry's point of view on the process of defence acquisition and the role of private companies in the defence sector. He brought forth the fact that the industry requires commitment in the form of Return on Investment (ROI); else they can't survive in a highly competitive market. Hence, the need to create an inclusive and participative environment is necessary. He also highlighted the need for indigenous technological development and its importance in India's march towards net-centric enablement. He said it is the willingness of the concerned stakeholders that can provide for path breaking technological advancements. Mr. Agarwal also suggested that it should be made mandatory that a part of the 30 per cent offsets in the form of transfer of technology should go towards implementation, as is the case in several countries.

Mr. Rajiv Mehrotra, Chairman and Managing Director, Shyam Vihaan Ltd

Mr. Mehrotra underlined the major concerns of the private sector regarding their capacity in providing defence solutions. He said that the dependence of the defence forces on the public sector was of great concern to the MSMEs. The need to save the interests of private players and provide them assurance was highlighted. A level playing field needs to be provided both for public and private

enterprises as well as start-ups and established players. He drew the audience's attention towards the fact that logical thinking, mathematics and astronomy was a forte of only three races in the world namely, the Indians, Persians and the Jews. The inbuilt capability and skills of Indians needs to be harnessed and utilised efficiently.

Lt Gen SP Kochhar, AVSM**, SM, VSM, ADC, SO-in-C &Sr Col Comdt

Lt Gen SP Kochhar began his talk by explaining that the main objective of the Army is to fight wars. All that is required to help the soldiers fight and win the war has to be developed and procured from the best solution provider. What is necessary is that whatever is supplied to the soldiers is reliable and available at all times. The problem lies in the fact that the policy makers who give out the operational requirements are not adept to latest technology. In the past, there wasn't much communication between the industry and the services. With this type of arrangement, the system had become complacent and was dependent on vendors while drafting RFPs, which was drafted in a manner so as to suit both sides keeping aside the operational requirements. It has been realised that this method does not work and the policy makers need to keep themselves abreast with the latest technologies in order to understand the requirements of the forces. One of the major problems is the clash between the industry's and the services' objectives. The industry's aims are centred on their balance sheets and the services aim to meet their operational requirements. There is a need for both parties to sit together and reach a solution which meets the operational requirements of the services, and with slight modifications can be used in the civil sector as well, so as to fulfil the industry's goals. Also, academia needs to be involved in the entire procedure as they have brilliant ideas and their out of the box thinking can greatly help in providing solutions.

Discussion: Technical Session III

The discussion revolved around the issue of adopting a collaborative approach of generating specifications. A suggestion came from the audience to have a website open to everybody where the requirements/RFI can be put up and anyone can propose his own solution. Also, the issues brought out in the seminar were national issues which concerned not only the defence forces, but the Indian society as a whole. Three ideas were recommended:

(a)   First, to know what ICT indigenisation is being done in the country and what is planned for the future.

(b)   For which future technologies will the PPP model be adopted.

(c)   Standardisation of technologies across the three services.

A member from the audience pointed out that a similar situation was faced by the US in the 1980s-90s. The US government set up Team 'Orlando' in Florida, which had representation from the defence industry, all four defence services, academia, R&D and think tanks. They institutionalised the project and established project offices which were made accountable and priority-based acquisition pointers were given. India can adopt a similar approach according to its particular requirements and reach a probable solution. Another point put forward was to address the problem of senior officials not being adept to technology. In this regard, it was suggested that a practice prevalent in private industry on the lines of "reverse mentoring" could be adopted wherein young people who are technologically savvy can teach and support the seniors in making them tech savvy. This will help a great deal in understanding what the defence forces require and how those requirements can be fulfilled.

Concluding Remarks: Maj Gen Dhruv C Katoch, SM, VSM (Retd)

The seminar was very helpful in bringing together experts from various fields including the defence, government and industry both private and public. The seminar helped the various sides understand each other's aspirations and needs. There was an urgent need to bring forth the perspectives of various stakeholders so that India can achieve true technological and ICT sovereignty and fulfill its role on the global stage. The findings of today's seminar shall be sent across to various ministries and relevant departments for their perusal. Such engagements will have to become a routine feature in the years to come so to fulfill the dreams and ambitions of all involved.

Valedictory Address: Dr.Jaijit Bhattacharya, President C-DEP

The seminar should provide the underpinnings of a long term partnership between the defence and domestic private industries. The beginning could be a humble one starting with non-critical military technologies being developed by domestic private industries with support from the government and defence community. The MoD and defence forces on their part will have to forge long term roadmap for technology requirement and induction. The private industry on its part will have to look beyond mere transactions and economics, and the courage to invest in risky high end technology. The issue of technological sovereignty in ICT is of paramount concern and hopefully this seminar will go some way in addressing the issue.