

Emerging Technologies For Sub- Conventional Conflict And Homeland Security

Centre for Land Warfare Studies
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Introduction

A seminar on “Emerging Technologies for Sub-Conventional Conflict & Homeland Security” was held at DRDO Bhavan, New Delhi on 20-21 August 2009, under the aegis of the Centre for Land Warfare Studies (CLAWS) and Confederation of Indian Industry (CII). The area of focus was the need to develop and acquire technologies for sub-conventional conflict and homeland security. The areas of concern for both industry and users were highlighted during the proceedings. It was attended by senior serving officers from the armed and para-military forces, the defence science fraternity, primarily the DRDO, and representatives of industry and the media. Mr MM Pallam Raju, Hon’ble Minister of State for Defence, was Chief Guest for the Inaugural Session.

The welcome address was delivered by Mr SK Munjal, Chairman Hero Corporate Services Ltd while Brig Gurmeet Kanwal (Retd), Director, CLAWS, delivered the theme address. The keynote address was made by Lt Gen Jasbir Singh, AVSM, VSM, DG Infantry. The seminar was held through three sessions over two days:

- Session I: Emerging Internal Security Scenario in India.
- Session II: Technologies for Emerging Threats.
- Session III: Protective Technologies.

Theme Address: Director, CLAWS

Brig Gurmeet Kanwal (Retd), Director, CLAWS, while highlighting the external threats India faces from its neighbours, also brought out the internal security challenges of the nation. He drew attention to the necessity to supplement and enhance human capabilities in the form of modern technologies. He suggested various fields wherein the industry could provide new technologies to enhance the fighting capabilities of the security forces. He expressed the hope that such interactive sessions would provide better understanding of the requirement of the security forces and in turn, facilitate faster production and availability of state of the art weapon and equipment systems.

Keynote Address: Director General of Infantry

Lt Gen Jasbir Singh briefly dwelt on the issue of homeland defence and its implications and reiterated the need to reshape India's capabilities to provide a balance of conventional and sub-conventional deterrence. He warned about the growing threat of 'Hybrid Wars' which states like ours will have to face in the future from non-state actors. To face such challenges he suggested a strategy to integrate all instruments of national power rather than relying on the application of force alone. The General also emphasised the need to integrate emerging technologies to augment the capabilities of the Infantry. Some areas where such technologies could be applied were:

- Light weight small size system for soldiers
- All weather, all terrain, day and night fighting capabilities.
- Low power consumption to increase sustainability.
- Cost effectiveness.

Inaugural Address: Hon'ble Minister of State for Defence

While complimenting CLAWS and CII for organising the seminar, the Minister of State for Defence, Shri MM Pallam Raju stressed the need to upgrade our weapon, telecommunication and security systems keeping threats like 26/11 in view. He emphasised the need for attaining self sustenance in the field of defence production by incorporating civil industry and achieving a target of 70 per cent indigenisation. He said that 30 per cent increase in the defence budget was indicative of the government's commitment towards this end. He hoped that such interactions between the users and the industry would pave

the way for faster realisation of our objectives.

Session I: Emerging Internal Security Scenario In India

Chair: General VP Malik , PVSM, AVSM, ADC, (Retd), Former Chief of the Army Staff

Panel: Lt Gen Mukesh Sabharwal, AVSM**, VSM, Adjutant General

Lt Gen GK Duggal, Former Director General Assam Rifles

Mr Prakash Singh, Former Director General Border Security Force

Lt Gen Mukesh Sabharwal, AVSM**, VSM: Emerging Situation in J&K and its Implications for India's Internal Security

Lt General Sabharwal examined the dimensions of proxy war and elucidated as to how Pakistan is using Jehadis to cause attrition to Indian Army while projecting insurgency as indigenous and the efforts it had been making to spread fundamentalism in India. He opined that in the last 20 years of conflict Pakistan's objective had remained unchanged.

In J&K per se he said that the security situation appears to have improved keeping the number of cease fire violations and infiltration in mind. However as the terrorist infrastructure was intact in Pakistan and as infiltration through other borders was on the increase, the overall security situation in the country remained a cause of concern.

Commenting on the socio-political situation in the state he spoke about the fallout of the Shri Amarnath Shrine Board (SASB) agitation and how this incident had given a new lease of life to the Hurriyat. However, he added that the situation was not as bad as it appeared to be since the 'so-called' public demonstrations were mostly carried out by unemployed youth paid to demonstrate and were mainly restricted to big towns. The successful conduct of the assembly elections was indicative of the fact that normalcy was slowly but surely returning to the Valley. Even the economic trend suggested an improved situation and with major projects being undertaken J&K the situation was likely to further improve.

Finally, talking of the implications of the emerging situation in J&K in the context of internal security Lt General Sabharwal highlighted certain issues:

- Increased infiltration from borders other than Pakistan, such as Bangladesh

and Nepal.

- Shift of terrorist's focus on the rest of India
- Need to strengthen local first responders such as police and para-military forces.
- Need for functional integration through an institutional framework at UHQ and field levels.
- Importance of ensuring ethnic / communal harmony.
- Need to avoid dilution of protective laws for security forces such as the AFSPA.
- Significance of governance and development.

Lt Gen GK Duggal, PVSM, AVSM, VrC (Retd) : Emerging situation in North-Eastern states and its implications for India's Look East Policy

Briefly touching upon the historical events that led to the current situation Lt General Duggal highlighted the factors that contributed to unrest in the region:

- Immigration of more than 12 million Bangladeshis since Independence and the changing demographic pattern in the region.
- Ethno-social conflict in many parts of the north-east such as Manipur, Tripura, and Nagaland.
- Weak governance due to political and bureaucratic corruption and degeneration of the judiciary.
- Flawed development strategy
 - o Exploitation of natural resources.
 - o Lost regional opportunities by local entrepreneurs.
 - o Under-utilisation of allocations made by the Centre.
 - o Concept of 'Inner Line Permit' in the states of Arunachal, Mizoram and Nagaland.

Lt General Duggal also gave a brief on the prevailing security situation in the north-eastern states. The following are highlights:

- Ceasefire by NSCN (I) and (K), constant rivalry between the two factions and inter play between them and other militant groups of the region.
- Illegal immigration leading to demographic imbalance in Assam and the political influence the Muslims have acquired has brought a fresh dimension to the security situation in the state.
- Emergence of various militant groups in Manipur and their growing clout in the state machinery.
- Growing influence of NSCN in some parts of Arunachal.
- The external influence such as Bangladesh being a safe haven for militants, Pakistan's continued support to militant groups through ISI etc.

The Government of India on its part has taken several initiatives lately with a Look-North East Policy clearly in focus. In the XIth Plan greater emphasis has been laid on developmental work with Rs 31,000 crores allocated for road construction alone. Power projects are being undertaken by PSUs and private players. Construction of the highway to Myanmar will open up a surface route to South-east Asia. Consequently, trade with ASEAN countries is likely to grow from the present US \$40 billion to US \$50 billion by 2010. Employment opportunities created by various projects and developmental work would automatically reduce the incidents of youths getting recruited by militant groups. Reduced local support combined with better governance would sound the death knell for militancy in the region.

Mr Prakash Singh: Emerging situation in the hinterland, spread of left-wing extremism and its implications for India's internal security

Mr Prakash Singh informed the audience that 13 states were affected by Naxal activities and highlighted the disturbing trend of rising Left-Wing Extremism (LWE) in the region. Some disturbing features of LWE are:

- Spread over a large geographical area.
- Increase in potential for violence.
- Unification of PW and MCCI leading to
- Increased armed following and firepower.
- Emergence of a pan-Indian revolutionary group.
- Link-up with Maoist parties of foreign countries.
- Plan to have Red Corridor stretching from Indo-Nepal Border (CRZ) and running through Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh and Andhra Pradesh.

Implications of CRZ:

- Drive a wedge through the country.
- Huge deposit of minerals in the region under Maoists influence.
- Liberated zones in the CRZ.
- Nexus with other militant organisations in the country
- Organising of bandhs to disrupt normal life on various pretexts.
- Giving call for boycott of elections.
- Preventing the execution of development projects.
- Holding Jan Adalats.
- Encouraging the cultivation of opium in their areas of influence.

Government has responded in good measure to negate the efforts of the

Naxalites. It has taken a holistic approach to the growing menace of Naxalism. It has set up inter-state coordination committees to synergise the efforts of the government and is sternly dealing with those indulging in violence. It has been made amply clear that no dialogue was possible unless Naxals gave up arms/ violence. Surrender and rehabilitation policy has also been put into place to encourage the misguided to get back into the mainstream. Various administrative and police action have also been initiated to counter the naxals. Certain socio-economic programs have been initiated to ensure the local inhabitants especially the tribals are not denied their rights.

- o Forest Rights Act, 2006 gives tribals the right to own, collect, use, dispose of minor forest produce.

- o Rehabilitation and Resettlement Policy, 2007

- Tribal Development Plan for displacement of 200 plus tribal families
- Consultation with Gram Sabha compulsory
- Land for displaced families, housing benefit for those who lose house
- Preference in project jobs, one job per nuclear family
- Vocational training, scholarships for children
- Rs.500 monthly pension for destitute, widows, unmarried girls

- o National Rural Employment Guarantee Program. NREGA is the largest ever public employment program visualised in human history. It holds out the prospect of transforming the livelihoods of the poorest and heralding a revolution in rural governance in India.

- o SALWA JUDUM – Mobilising Peoples’ Support. A spontaneous movement expressing the resentment of the tribals against the Naxalites interference with their social customs, cultural practices and economic interests.

Comments by the Chairman

General VP Malik summed up the session by emphasising the need to upgrade technologies for counter infiltration and counter terrorism and suggested functional integration of the govt machineries through good communication systems. He opined that synergised approach augmented by modern technologies was the only way to neutralise the growing security concerns of the nation.

Session II: Technologies for Emerging Threats

Chair : Dr Prahlada, Chief Controller R&D (SI) & DS, DRDO and Brig

Gurmeet Kanwal (Retd)

Panel : Among the panelists were Maj Gen AK Mehra: Trident Consultants, Mr Manik Mukherjee, Director, G-Fast, DRDO, Mr KV Srinivasan, Group Director, Aeronautical Development Establishment, Mr Subodh Vardhan, Director Sales and Country Head, Motorola India Pvt Ltd (G&PS), Col Ashok Kochhar (Retd), Senior Technology Consultant, Agilent Technologies Limited, Col Vishu Sikka, General Manager, Defence & Security, SAP India Pvt Ltd, Lt Col N Sriramesh, Assistant Director, Combat Vehicle Research & Development Establishment and Col Sukhvinder Hayer (Retd), Deputy General Manager, Mahindra Defence Systems.

Chairperson's Remarks

Dr Prahlada informed that the speakers would discuss how technology can help in sub-conventional warfare. Since guerilla wars are not organised operations and no SOPs on such wars exist, it was extremely difficult for counter-insurgents to fight the non-state actors, he explained. As technology could be utilised by insurgents too, it was extremely important to technologically enable the security forces to operate in all environments.

Maj Gen AK Mehra : Employment of technologies for Homeland Security

The General opined that only those nations which could provide security to their citizens would progress and that the entire nation could be secured against unconventional threats if technology was made available to security forces. The need of the hour is to substitute traditional manual security with the technology intensive security system, he reiterated. Human dimension would always remain important irrespective of the innovation in technology and cannot be separated from the system although over-reliance on manpower would be minimised. With the help of video analytics, radar and sensor based surveillance including smart fence and full control on information access through contact-less smart cards or palm vein readers, very high degree of security can be assured. Such security services are already being used by nuclear establishments in India. All the sensitive installations and places can be put under surveillance through Integrated System Solution (ISS) which comprised of number of networks. ISS can also help in data-mining and identification in almost real time. However, the

General cautioned that legal and ethical issues of electronic surveillance needed to be discussed publicly. He also mentioned that there was lack of standard electronic based security and public participation in India.

Mr Manik Mukherjee: ISR & Communication Technology

In the present times, to fight all sort of sub-conventional warfare, be it local, cross-border or global, Intelligence, Surveillance and Reconnaissance (ISR) and communication technologies are essential. Mr Mukherji informed that DRDO had developed efficient ISR capabilities and were in the process of making it even better. The use of satellite and space for signal intelligence, wireless sensor network in urban environment for secure communication, GIS for location identification and timely multi-intelligence data fusion could prevent terrorist activities from taking place. ISR capabilities can also help commanders and troops by increasing the transparency of the area under observation. Ironically, terrorists have all the latest gadgets and information while security forces are lacking in this regard. There is also a need to have inter-agency data sharing and communication mechanism so that crucial decisions can be taken in real time. Mr Mukherji felt that preparing various agencies through exercises similar to war-gaming would give the security forces an edge over the terrorists. Dual-use technology can be made use of particularly in the urban areas.

Mr KV Srinivasan: Surveillance Systems & UAV's

Mr Srinivasan explained that UAVs could gather information, do surveillance over large geographical areas and reconnoiter a specified area of interest. UAVs can supplant or aid manned aircraft in intelligence gathering, deep penetration into enemy territories, communication and also as a tool for psychological warfare. UAVs are fast emerging as the poor man's satellite. With the advancement in technology some UAVs have even a global reach. He informed that the US had the maximum number of UAVs deployed and one of its UAVs, the Global Hawk could take on the many responsibilities of satellites. UAVs can also be used in variety of other roles, for instance, law and order maintenance, traffic control and disaster management. Mini-UAVs can be soldier's assets and micro-UAVs will be the future of UAVs. UAVs are equally useful for maritime applications. However, some of the technology challenges have to be overcome. India at present has the Nishant and Heron UAVs deployed by the Indian Army along the border. If properly integrated to

the system UAVs could help in having real time solution for several problems, he opined.

Mr Subodh Vardhan : Mission Critical Communications- Preparing for the Challenges Ahead

Command and Control cannot work without communication. Therefore, Mr Vardhan felt that having an inter-agency all weather resilient private communication network, mission critical communications, specifically designed as a contingency measure would be useful. Such kind of network is usually multi-layered and capable of sustaining communication even if a few layers of communication are completely destroyed. Normally, public network developed for commercial use has limitation to support a specific amount of traffic. When any untoward incident happens, due to excessive load, the network stops functioning and communication stops. Mr Vardhan emphasised the need to have sturdy and effective communication system for the security forces.

Col Ashok Kochhar (Retd): Techniques and Trends in Signal Monitoring, Frequency Management and Geo Location of Wireless Emitters in a Networked Environment

Since terrorism is going to stay therefore, fortification of the crucial assets through network based latest technologies is very important. Col Kochhar stated that adding RF surveillance layer in addition to fortification, physical access control, video surveillance in the area of interest (under surveillance) would be instrumental in detecting and locating the individuals. RF network is sensor-based and can be remotely controlled. Being centrally controlled, it would reduce use of precious manpower. It could detect coherent and non-coherent signals and is fault tolerant and therefore, Col Kochhar felt that such systems, if acquired, would work as force multiplier and enhance the fighting capability of the SFs.

Col Vishu Sikka: Enterprise Solutions for Internal Security and Police Investigative & Intelligence Agencies

Number of organisations and government departments across the world are using SAP platforms for security solutions. Even during the last Euro Football World Cup, SAP platform was used. SAP provides solution to several

problems like keeping record of uncorrelated incidents, domestic policing and justice, identity management, border control and management, movement compliance, emergency response and crisis management, national and international counter-terrorism, data management, data mining, tracking offenders, intelligence analytics and even administrative support system. Integration of both intra-department and inter-department networks can be done through these platforms and services are available in several languages. Col Sikka reiterated that SFs could utilise the services of an organisation like SAP to augment its fighting capabilities.

Lt Col N Sriramesh: Urban Warfare Concept Vehicle

It was informed that the basic idea behind the Urban Warfare Concept Vehicle was to minimise casualties through preparedness. This vehicle would be indigenously designed with state of the art technologies and would be a force multiplier, tailor made with all 360° protection, duly fitted with surveillance devices and lethal as well as non-lethal weapons. The vehicle will have provisions including water and medical aid to sustain the crew for days. The future versions would be unmanned.

Col Sukhvinder Hayer (Retd): Specialised Vehicles for Security Forces

Col Hayer highlighted the fact that while lighter vehicles were being used in counter-insurgency operations most of the time to minimise collateral damage, vulnerability of the soldiers when they are being transported from one place to other, particularly in naxal-affected areas where distances between posts are more, needed to be considered on priority. Between 20 to 25 per cent of the soldiers are deployed ROP duties and security of roads in the affected areas. Col Hayer underscored the fact that people who were securing the channels of transportation themselves were so vulnerable to the land mines and other attacks. There are varieties of bullet-proof and mine protected vehicles used by security forces for varied purposes; however, light vehicles cannot be mine protected since minimum 7 to 8 tonnes vehicle is required for the purpose. In the lightweight mine-proof vehicles casualty is caused when a vehicle thrown into the air due to IED explosion hits the ground and sometimes turns turtle. The best armouring is done from inside to make the glass bullet proof rather than multi-layering which just makes it bullet-resistant. He recommended steel alloyed and heavier vehicles for SFs to facilitate better bullet proofing and anti-mine protection and thus, reduce

own casualty rate.

Discussion:

Having private inter-agency inter-operable communication network with more redundancy and resilience dimensioned for emergency is very important. Commercially available systems do not serve the requirements of tough terrain and harsh weather conditions. Therefore, it was felt that it would be better if equipment and systems are designed and produced keeping ground reality in mind.

Unlike Armed Forces, Para-military forces and state police do not have institutions for testing the equipment. Some of the audience suggested better cooperation in this regard. Also, there was a need for standardised mechanisms and institutions for management of equipment and systems.

Brigadier Gurmeet Kanwal summed up the proceedings by stating that technology could help us in several ways in our endeavours right from conception to implementation as it is an enabler. Producing all weather and all terrain equipment has cost factor attached to it which cannot be ignored. Inter-agency mechanisms to look into the matters related to standardisation and testing are immediately required to be looked into at the appropriate level. Technological changes and development of new concepts would continue to take place and therefore, the onus was on us to be clear as to what we actually want.

Session III: Protective Technologies

Chair: Dr K Shekhar

Panel: Dr Beer Singh, Mr AK Malik, Mr Debasish Brahmachari, Col AK Gupta (Retd.) and Mr Prabhu Mani

In his opening remark Dr. K Shekhar highlighted that protective technologies are multi-dimensional. Avoidance to exposure; physical protection of individual and community; creates safe places in case of nuclear fallout; availability of medical counter measures to people exposed and decontamination, all fall in the ambit of protective technologies.

Dr Beer Singh: Protective Technologies

Dr Singh talked about Chemical, Biological, Radiological and Nuclear (CBRN) protective technologies. He briefly dealt with the history of the observance to non-use of the chemical and biological weapons by 108 countries; however, the use of CBRN by the terrorists cannot be checked due to easy availability of required material and technology. He underscored the fact that the counter-measures to CBRN required three stages, i.e., detection; decontamination and protection. According to Dr Singh training and management also forms an important component of counter-measures to CBRN. He brought to light various technologies like water poison detectors, manual detectors, remote sensing detectors, bio-detectors, NIGAS, mobile nuclear field vehicles, that are available to detect post-contamination due to the use of CBRN.

Mr AK Musla: Technologies for Sighting Equipments

Mr Musla's in his presentation showcased various technologies that are available in the market and its applications. These technologies include day and night vision, laser instruments, stabilisation, digital image and signal processing, ballistic computation, and platform integration. He also talked about the importance of Holographic Sight. He stressed that HMD and sensor networking is an essential requirement for the soldier. Mr Musla also mentioned spoke on different types of detectors; the world scenario where thermal imagers are made; and the history of gated imaging and its importance and relevance. He made a detailed comparison between images of Normal and Gated Mode; SWIR and MWIR; and EMCCD and ICCMD cameras. He concluded that the integration of all technologies and systems is required for land, coast and air security.

Mr Debashish and Dr KD Vyas: Chemical Agents Detection by Ion Mobilisation Spectrometry

Mr Debashish and Dr Vyas said that the homeland security warfront is shifting from borders to backyards, from conventional to unconventional, and from visible to invisible enemy where civilian population and infrastructure have become a target. They mentioned about the brief history of change in the use

of weapons and technologies since 1995 when Sarin gas was used in Kumashigaki station in Japan that killed 12 to 15 people and concluded that the weapons to create casualties that are used might change tomorrow. They also talked about the need to develop indigenous technologies in association with DRDO and armed forces. They also briefly mentioned about the challenges and packaging involved in manufacturing the equipment as the gadgets are small creating a challenge of engineering and design.

Mr AK Gupta: Opto Electronics

Mr AK Gupta that the most important and effective component of homeland security is the infantry soldier who has to be suitably equipped. Mr.Gupta mentioned that several products are available with various features to satisfy the diverse demand that include target acquisition system, observation and surveillance and special system for counter-insurgency. He emphasised the advantages and various features of reflex sight, magnifier, night-use binocular, VIPER, thermal imager, and multi-purpose T1 sight explorer. He also talked about various Mounts for INSAS and AK-47. He also pointed out the importance of Corner Shot for anti-insurgency and anti-terrorist operations.

Mr Prabhu Mani: Bullet Resistant Materials and Equipment – A Regulatory Perspective

Mr Prabhu dwelt in his paper on Bullet Resistant Materials and Equipment – A Regulatory Perspective and mentioned about the Underwriter's Laboratories life-safety and security system (both physical and electronic); ballistic missile resistances; processes to certify bullet resistance and standards for ballistic testing. He mentioned in his paper that the ballistic threats depend upon its application.

Discussion:

- Availability of information about the new security gadgets available in the market. DRDO must prepare a white paper on security devices in order to raise awareness amongst the armed forces.
- Availability of funds for procurement of security gadgets.
- Narrowing the gap between research and development and the homeland

requirement.

- Absence of the right target audience.
- Evaluation systems for security testing needs to be upgraded and made clear.
- Lack of standardisation can be overcome if DRDO sets the standards as not many companies are manufacturing and supplying the security devices. Standardisation will reduce corruption.
- Infantry and DRDO must work together for the needs of future soldier.
- Coordination between various institutions needs to be taken seriously and urgently.

Valedictory Session

Panel: Mr Gurpal Singh (Deputy Director General, CII), Dr K Sekhar (Chief Controller R&D, DRDO), and Brigadier Gurmeet Kanwal (Director, CLAWS).

Opening Remark: Mr. Gurpal Singh

Mr Gurpal Singh stated that the objective of the seminar was to create awareness and bridge the gap between industries and the users and presumed that the objective was met. He underscored that with change in the nature of security there is a need to integrate IT and private sector. In this regard CII can be given a responsibility to integrate system and security to prevent human loss and alarm socio-economic fabric. He emphasised that government and the private sector must work together for the security and that measures should be implemented on ground. He reiterated that policy formulation, modernization and industrial preparedness needed urgent consideration. He pointed out that institutionalization can trim down delays in action.

Valedictory Address: Dr K Shekhar

The last 25 years have witnessed globalisation of the economy, thus making the world one economic unit. However, politically, the world has witnessed the rise of sub-national identities including acts of terrorism and trans-national terrorism. The sub-conventional battle has certain common security demands. It is important for DRDO to keep updating its technology in consultation with the users to achieve success in early warning early detection to minimise

security threats. He emphasized that data base of all products needs to be compiled and categorized into detection, protection and decontamination. Also, there is a need for data base for ready to use weapons and those weapons that need minor modification and that require preparation of data base for future necessity by security agency in coordination with DRDO. He concluded that transnational terrorism can be controlled through international cooperation and think tanks could play an important role in creating awareness and collaborations.

Vote of Thanks: Brigadier Gurmeet Kanwal

Brigadier Kanwal said that while nations are at peace, security forces are at war with an unseen and unknown adversary. He reiterated that while the challenges of conventional conflict have receded, the sub-conventional conflicts are here to stay. He also pointed out that the counter-insurgency is not a role of army and para-military but the recent internal security threats have forced the army to adopt the role and it will not change in near future. Brigadier Kanwal expressed his appreciation for the success of the seminar as it was able to achieve its objective of bringing together the representatives of the security forces and strategic community including those from homeland defence, industry, manufacturers and the research community on the same platform.

Brigadier Kanwal asserted that we must utilise our immense buyer clout to beat down the prices by coordinating purchases. To achieve this goal there was a need to centralize procurement of arms and security devices. He felt that CII could play a bridge between the users, industry, research and development and other organisations. He also pointed out that there was an urgent need for upgradation of the security apparatus in our country.

Conclusion

The seminar showcased the emerging technologies to counter sub-conventional conflict and homeland security scenario in India. It also highlighted the fact that there was an urgent requirement to upgrade the homeland security.

(Report compiled by Col Jarken Gamlin, SM, VSM, Dr Rajesh Kapoor and Dr

Mansi Mehrotra)