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Integration of Civil Communication Resources with Military Communication

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ABSTRACT

An effective communication system is a pre-condition to efficient execution of operational plan. Being a third world country we can ill effort having a comprehensive and modern communication system for Armed Forces. Therefore, it is imperative for us to integrate the national communication resources to achieve a synergistic effect. However such integration is not possible without prior planning and preparation. Hence it is mandatory for us to take an account of our total resources and formulate an integration plan of civil communication resources to optimize the use of the entire communication assets of the nation. Such fore-planning will enable us to achieve a smooth integration of civil communication resources during a national emergency.

Keywords : Civil, Communication, Resources, Nation, Command, Control, Technology, Army, Air Force, Navy, Network

1 Introduction

1.1 Command, Control and Communication (C3) are the three essential aspects of war and victory in the war is steered by these three essential factors. The Command is exercised through a communication system to have control over the battlefield. As a result, communication is considered as the voice, eyes and the ears of the commanders and that is why a reliable communication system is a prime requirement to manoeuvre combat forces in the battlefield. Good communication helps the commander to take timely decisions and this will accelerate the process of victory.

1.2 Communication technology started mastering the battle field from the ancient time with the use of visual and field signals in the battle field. With the passage of time the development of electronic communication devices continued very fast. The invention of infrared device (IR) during the World War-II played a significant role in the battle field and drew special emphasis. Thereafter, it had a speedy journey in the development process and finally culminated with the invention of computer technology. The conversion of analog electrical devices to digital ones opened new avenues for enhancing speed in the field of communication.

1.3 Their combat power is too high and adequately developed on modern technology. They are in fact capable to change the pattern of war to conform their operation plan. It is likely that fighting will take place simultaneously almost in all the fronts and due to limited depth and use of hi-tech the pattern is likely to be intense and short lived. This will entail huge and modern communication resources to establish a sustainable communication network between Headquarters of all levels simultaneously. Keeping in view the above aspects, an effort has been made through this article to take an account of the available national communication resources, which may be utilized for future war and recommend how best we can integrate those resources with the military communication to achieve synergistic effect.

2 Resources Available With the Components of Armed Forces

2.1 Army, Air Force and Navy are independent of their communication need. AF is in the process of formulating Joint Services Communication Network.

2.2 **Army:** The present state of communication resources of Army is not well modernized to meet the requirement. Such condition was prevailing all through since the birth. But communication infrastructure could hardly be developed as expected to be. The major procurements of communication equipments for Army took place in and around 1995, which are still being used. Thereafter procurement of Radio Relay (RR)

equipment for Army and microwave link for AF and use of fibre optics network of Telephone and Telegraph Board by both Navy and AF somehow improved the overall state. Many of those equipments have become by now obsolete though we are still using. The reliability aspect of those equipments is almost at zero level except few; those were purchased at the later stages. Most of them are very old and lacks modern options or facilities, which need to be phased out immediately. The presently held communication equipments of Army are as under:

2.2.1 Wireless Sets: Presently Army is equipped with Very High Frequency (VHF) wireless sets to maintain communication between Platoon to Company Headquarters, Company to Battalion and Battalion to Brigade Headquarters. High Frequency (HF) sets are mainly used to maintain communication between Brigades and Division/formation Headquarters.

2.2.2 RR: RR is being used to establish microwave links between brigades, formations and Army Headquarters. In addition Army uses the microwave facilities in a limited scale. They also have telecommunication links between formations and major garrisons through network.

2.2.3 PABX (Private Automatic Branch Exchanges) or Field Exchanges: PABX or Field exchanges are also used in Army to maintain war time field communication and peace time static communication. Those exchanges are from 10 lines to 5000 lines.

2.2.4 Signal Centre (Sigcen): To maintain mail facility within the AF, Signal Centre is established in the field and static location. Mails are dispatched by Air dispatch service (ADS), Train dispatch service (TDS), Bus/Boat dispatch service (BDS) to different garrison/ installations.

2.3 Navy Communication: Navy has three major and one minor shore communication centres (COMCEN). All the COMCENs are equipped with adequate number of transmitters and receivers covering all the radio frequency bands used by Navy and other Maritime elements as per international Maritime Laws. Major COMCENs are also interconnected with each other through various land lines. Schematic diagram of navy communication network. Short description of Navy communication is as follows:

2.3.1 Shore to Shore: For shore to shore communication that is communication between shore headquarters, area command and establishments/units, navy uses land lines such as telephone, fax and telex as primary means. Radio sets are used as secondary means.

2.3.2 Shore to Ship and Vice-VersaFor shore to ship communication and vice-versa navy uses radio communication sets of HF, VHF and Ultra High Frequency (UHF) bands as suitable according to the distance.

2.3.3 Tactical Communication: Following systems/means are used in navy for tactical communication:

2.3.3.1 Shore Establishments/Units.

(i) VHF/Walkie-Talkie sets aided by fixed/portable repeaters.

(ii) Land line telephone.

2.3.3.2 Ships Use following Means:

(i) VHF sets.

(i) UHF sets.

(iii) Walkie-Talkie sets.

(iv) Flags/flashing lights for visual communication.

2.3.4 Navy Telecommunication Network: Navy has a total of 8 PABXs in the major establishments. BN also has Fibre Optic Communication Network connecting the main PABXs of Dhaka, Chittagong and Khulna area.

2.3.5 Comments: Navy communication network is the smallest among the AF and is mainly biased towards the three major shore COMCENS. Navy maintains its communication requirements mainly by wireless sets and the secondary means is the land lines. Navy is going to improve its line communication by integrating more number of microwave links in its communication network along with Air Force. We may plan to use their communication facilities when we need to deploy our forces near their COMCENs. Navy is likely to take support from Army for UHF link up to Mongla.

2.4 **Air Force Communication**

2.4.1 Air Force has undertaken a project named FALCON EYE to expand and upgrade their existing analogue microwave communication link to a digital one. The link is basically for radar operation for Air Defence Operation Centre (ADOC). It will also enable Air Force to communicate with their bases. The FALCON EYE project has been already implemented partially.

2.5 Comments: By integrating maximum number of microwave links Air Force has developed its communication infrastructure more widely. Implementation of their FALCON EYE project has enabled them to communicate with their organizations/installations dispersed throughout Bangladesh in easiest way. Already Army has planned and now on the way of executing the plan to integrate their microwave links for static communication. Air Force is also likely to take support from Army for UHF link.

3 Resources Available with Para Military Forces

3.1 Boarder Guard, Police, Special Forces,Gendamery, Ansar and Village Defence Party and) are known as the para military forces. Among those forces, Border Guard and Police have their own communication network widely dispersed throughout the country. Army needs to work jointly with these forces in war and peace time.

3.2 Boarder Goard Communication: Boarder Goard communication system entails both field and static communication. Apart from line communication which is integrated with national communication network, all other communication means are independently installed and maintained by Boarder Goard.

3.2.1 Radio Communication: Radios are used throughout Boarder Goard from Boarder Goard Headquarters, down to BOP level using different types of sets at different levels:

3.2.1.1 Command Nets: There are 4 levels of command networks working from Headquarters Boarder Goard down to BOPs for voice and massage/data communication at different levels. A total of 204 such nets are functioning. Details of various radio networks are as under:

(i) Headquarters Boarder Goard to Sector Headquarters.
(ii) Sector Headquarters to Battalion Headquarters.
(iii) Battalion Headquarters to Company Headquarters.
(iv) Company Headquarters to BOPs.

3.2.1.1 UHF Walkie-Talkie Nets**:** Presently Boarder Goard extensively is using walkie-talkie nets throughout BDR by 4 Watt hand-held walkie-talkie sets or Portable Radios operating through repeaters and antenna masts which is an additional facility to VHF.

3.2.2 Line Communication: The Following static line communications are available in Boarder Goard:

3.2.2.1 Exchanges: Headquarter Boarder Goard down to Battalion Headquarters are equipped with digital exchanges (less hotlines which are connected with PABX from Headquarter Boarder Goard to Sector Headquarters).

3.2.2.2 Hotlines: All Sector Headquarters are directly connected with Headquarters Boarder Goard exchange through telephone hotline from national

3.3. Police Communication: Telecommunication organization in Police plays a vital roll and helps to maintain law and order promptly throughout the country. Tele-Communication was set up in 1966, the responsibility of this organization is to provide wireless communication facilities.

3.4 Special Guard: These two organizations use UHF, HF based telephone communication system to connect their installations. When Special Guard will come under the operational control of AF, their communication equipment can be utilized in case of emergency which requires integration plan during peace time.

4 Communication Resources in Civil Sector

4.1 National communication is the backbone of all civil organization's communication infrastructure. There are number of civil organizations

raised in the recent past to provide cellular communication facilities in the country. Existing Optical Fibre Network of Telephone board. The Optical Fibre network project of Telephone board is under construction. The project covers the following areas/links as on today. Telephone board plays the most vital role in the communication sector of our country. Telephone board is continuing to extend its Microwave Link throughout the country to meet the increasing demand of the people. Telephone board cell phone is coming very soon with NWD facilities. Army has to always depend on Telephone board for their static communication. In war time, we may have to use their land lines including their other communication resources. If we plan to take necessary help from their Optical Fibre laid across the country then we need to know the nodes/switching centre across the country. Thereafter, we may plan and take necessary preparation to utilize their resources considering the future operational need.

4.2 Railway Communication: Railway network covers a wide distance almost the entire country. Railway developed an Optical Fiber based digital telecommunication network for its own use covering anwide range of the railway route connecting nearly 250 railway stations. An Optical Fiber is being laid along this new line which will connect the existing network without using any microwave tower for transmission over the river

4.3 Communication Resources of Other Organizations: Other organization like Meteorological Department , Rural Electrification Board (REB), Power Development Board (PDB), Inland Water Transport Corporation and Petroleum Corporation has their own Tele/Radio communication[6] which can also be integrated and used on a test and trial basis in peace time for effective use in case of emergency.

4.4 Communication Resources of Cellular Companies:. Mobile phone has a wide coverage of Optical Fiber network duplicated by digital microwave as a measure of redundancy. This organization has taken lease of Optical Fibre network from BR. They also further extended this link as per their commercial need. Presently among all the mobile telephone service providers they have the maximum coverage area Mobile is the second largest mobile operator. They used the same technology, protocol and frequency. As on today, Mobile has established total 5 main switching centre which are located only in the major cities. To connect MSC's they have their own micro wave network and they are in the process of integrating Optical Fibre network as well.

5 Necessity of Integration

5.1 The pattern of war has been observed during world war-II in 1945, owing to application of technology in manufacturing of latest weapon and armament system to use them in the battle field. The invention of nuclear weapon has forced the Generals to change their tactics and pattern of war all over the world to maintain a balance of power. But soon after that technology started developing so rapidly that could successfully merge the computer networks and the telecommunication systems into a common digital platform. Consequently, authorities around the world are faced with the challenge of modernizing respective communication back-bone. During the war against Iraq, the multi national force have used very high tech and new communication equipments to exercise their C3 which made the communication network of Iraq ineffective at the outset of the invasion.

5.2 Like all others, Airforce felt the necessity of upgrading the present communication infrastructure to meet the future war with the change of operation plan of blending conventional and unconventional operations in near future. The ongoing war in Iraq is a burning example of blending conventional and unconventional warfare which Army is planning to adopt in future wars. The concept of fighting "Total Peoples War" demands huge communication infrastructure. But the economic condition of the country does not allow Airforce to fulfil the requirement. With the changing pattern of operation plan it is necessary to reform the communication structure to meet the requirement of future war. Keeping in view the all above concept Bangladesh AF recently undertaken a program to modernize existing system.

5.3 It is discernible that individual approach to any communication system is costly and could turn into a duplication of effort. Much can be saved and better communication achieved through resource sharing. An integrated communication system is therefore the need of the day. Following are the advantages of an integrated system.

5.3.1 Will ensure better service through a single system.

5.3.2 Serve as a multiple communication system for the Airforce and also become an alternative means of communication for the Airforce during disaster management and emergency.

5.3.3 Will save substantial cost in comparison to have independent communication infrastructure of individual services.

5.3.4 Will avoid duplication of effort by individual services.

5.3.5 Will meet present communication requirements and also have the expansion facilities for future requirements.

5.4 From the above advantages it is clear that Airforce communication resources must be integrated with civil communication resources to meet the future communication challenges in the battle field.

6 Prospect in Integrating Civil Communication Resources

6.1 Difficulties of Present Communication Resources of Army: If we look at the state of present communication resources of Army we will find that the organization possesses major equipments which were procured during 1995.The equipments those were procured around 1990's are about to be phased out. Most of the communication equipments are back dated and do not possess modern facilities. Limitations of communication equipments of Army are as under:

6.1.1 For the voice communication Army uses only radio sets. It does not have capability of exchanging data or graphics. It does not use any security features such as scrambler, electronic counter counter measures or ciphering. Exploring telephone communication over radio is not being practiced.

6.1.2 For the tactical microwave communication RR is being used, which was proved to be very unstable due to use of too many relay stations. Present RR systems are not capable of making use of microwave or Optical Fibre network.

6.1.3 Analog system PABX's or field telephone exchanges are mostly used in Army. It does not have Multiple Access Points other than communication through analog telephone. Exchanges do not have digital trunking facilities to explore directly from Microwave or Optical Fibre communication or Radio Access Point to explore UHF/VHF/HF communication.

6.1.4 The cable used in Army for line communication has more loop resistance thus unable to provide communication for desired distance.

6.1.5 The handling procedure in Sigcens at various Headquarters are still back dated. Most of the works at Sigcens are done manually and no automation for sorting and identification has been introduced so far.

6.1.6 Microwave communication is the backbone of land based communication in all cantonments through out the country. In case of any break down, Army would not have any alternative means to maintain communication with distant cantonment except radio. Presently, Army is developing its micro wave backbone by integrating with 'Falcon Eye' project of Airforce.

6.2 Benefits of Using Civil Communication Resources: From the previous discussion it is clear that TTB and communication is the backbone of national communication. Both the organizations have their Optical Fibre network throughout Bangladesh. This Optical Fibre network has got huge capacity of bandwidth and super high speed than any communication backbone available in our country. An important aspect of this network is that it has been laid two and half feet beneath the surface, which ensures its physical protection from enemy's air and ground attack. Another significant step being taken by TTB by establishing numerous towers of Micro Wave and UHF link-throughout country down to all upazillas.

7 Integration Plan of Civil Communication Resources

7.1 Followings are the suggested preliminary activities need to be performed before executing the integration:

7.1.1 Identify and Create Nodal Points to Support Communication Requirement of Operations Plan: It has been mentioned before that civil communication resources will be used as an alternative means of communication to the Airforce. conventional communication. Civil communication will also be used to fill the gaps where part of the communication is damaged. It is unlikely that enemy is going to destroy our entire communication infrastructure, thus in some cases, only bridging the gap will be urgently required. As such, we now must select potential nodal points around the country basing on AOR of respective formation.

7.1.2 Identify the Support Equipments of Interfacing Devices to Make Use Optical Fibre: To get the Effective communication support, one has to know about the equipments of other organization. This is a long-term affair, as their equipment /technology is developing through continuous process and procurement of interfacing devices are also important as well. Yet there may be some equipment for which no interfacing devices will be available in the local market. Thus, planning of integrating other's communication equipment cannot be done before the interfacing devices are in hand.

7.1.3 Technical Knowledge of Other Services Equipment: Without enough technical knowledge, communication equipment may not work during need. Technical knowledge cannot be developed over-night, as it is developed with theoretical knowledge and practical

experiences side by side. Thus, to develop technical know-how, the process should start at the inception of any procurement. A user must have knowledge of own, other's equipment and interfacing devices, to achieve positive results out of those.

7.1.4 Develop Technical Expertise in the field of Integration: A group of personnel should be trained to undertake integration assignment during emergency. The group will be comprised of officers and other ranks as success on civil-military communication integration lies on appropriate planning, which is mostly done by the officers.

8 Suggested Action Plan

8.1 For utilizing huge national communication resources suggested action plan is as under:

8.1.1 Formulating a Policy on Integration of National Communication Resources: So far there is no policy regarding use of national resources during the emergency there fore a policy needs to be immediately formulated on integration of national communication resources. In that policy proper coordinating guideline is to be given at the topmost level of all these agencies with appropriate government directives. Otherwise, at grass root level severe bureaucratic hassle is likely to continue.

8.1.2 Security Classification of National Communication Resources: Security classification of these assets needs to be upgraded immediately. Otherwise, if this information is divulged to adversary intentionally or unintentionally, then these vital assets will be the first targets of enemy air onslaught. Therefore, it will be very difficult to use these resources during crisis unless appropriate measures are being taken to ensure security.

8.1.3 Maintain Up to Date Information: A database is to be maintained at appropriate level and this is to be updated regularly whenever any expansion or change takes place. Accuracy of this database can be maintained through cross checks from higher as well as lower echelons of every organization.

8.1.4 Development of Professionalism: Information and computer technology (ICT) plays a vital role in modern communication. Therefore, continuous effort should be made to enhance the professionalism of all members of Corps of Signals. It has been seen that Signallers lack technical know-how in handling latest sophisticated communication equipment. Only enhanced technical know-how can bring desired professionalism in the Corps of Signals.

8.1.5 Integrated Effort by Related Agencies: Some projects in the AF are already underway to enhance military communication system through an integrated approach. Likewise, more steps may be undertaken through Joint Services Communication Network. Thereby, interoperability will increase to a great extent and it will be easier to carryout joint operations.

8.1.6 Integrate AF In Developing Future National Communication Infrastructure: Unplanned development of communication infrastructures without consultation of AF may be a threat to national security.

8.1.7 Conducting Seminar/Workshop with Other Communication Agencies In Civil Sectors: We can very well realize the fast trend of development in the field of ICT. Therefore, seminar/workshop should be organized with national communication agencies to enhance our technical knowledge and to keep abreast with the latest developments in the field of ICT.

9. DIFFICULTIES IN INTEGRATING CIVIL COMMUNICATION RESOURSES

9.1 Considering the communication requirement for future followings are the likely communication related problems, which may be encountered by Army in future:

9.1.1 Radio equipments of Army may not be compatible with other available radios used by sister services, government/NGOs though all operate in same band of frequency.

9.1.2 During the war or any adverse communication environment, when most of the communication systems would be out of order, some of the national communication backbone may still be partially used. In that case, we may not be able to make use of those due to non-availability of proper access points.

9.1.3 Some of the equipment of Army may have access points even though we might not be able to utilize those due to non-availability of proper interfacing devices.

9.1.4 Some of the equipment may have access points and interfacing devices even though we may not be able to utilize those due to non-availability of required technical expertise.

9.1.5 In some cases we may have access points, interfacing devices and even technical expertise but yet may not be able to utilize due

to non-availability of updated technical information and data of those equipment.

9.1.6 There might be some situation where we may have access points, interfacing devices, required technical expertise and even updated information and data, even though we may not be able to utilize due to non-availability of appropriate sanction from other agencies.

9.1.7 With the slow handling system of dispatch services and exchange of data in Sigcen, may not be able to function with desired speed and efficiency due to its very slow and manual system of working procedure.

10 CONCLUSION

10.1 The world today is experiencing a new wave of revolution in the field of communication. The revolution is dynamic, fast spreading and encompassing all spheres of the society. This has a far-reaching influence in global military C3 system. To meet the challenges of future environment the forces need to achieve a very high mobility and sophisticated firepower. To cope with that it should also have sophisticated communication equipment to sense the enemy, and its environment almost in real time. To meet the challenges of future communication need, the developed armies of the world incorporated many advance systems.

10.2 C3 has always been a vital aspect for military operations. Any integration process in the C3 system of BD Army needs the formulation of a policy at the national level. Awareness about the importance of this may be developed by incorporating the subject in various courses at signal school and by conducting conferences and workshops. The systems may be tested in a Division under control of Army Headquarter. A dedicated organization is an essential to materialize such an approach.

10.3 The major problems of integration are incompatibility of communication set, lack of skilled manpower, insufficient security measures, absence of relevant training, insufficient instructions in the proposed joint warfare doctrine and few others. Growing awareness, collection of information of civil communication resources, feasibility study, formulation of government policy, relevant training, and location of nodal points and procurement of interfacing devices are few steps to be taken prior integration. Establishing communication Hub, WLL and VSAT are few options for physical integration. Some long term steps like standardization of equipments, and maintenance of data bank by services headquarters would ensure smooth integration in future.

11 RECOMMENDATIONS

11.1 The following recommendations are made:

11.1.1 A committee may be formed at National level for formulating a policy on integration of national communication resources. A coordinating body at Armed Forces may coordinate this entire effort through BTRC with all organizations.

11.1.2 An effort should be made at national level to integrate Air Force in developing future national communication infrastructure.

11.1.3 A detail study may be carried out by the Air Force to find out the suitable integration plan and technical requirements to full fill the proposed plan.

11.1.4 An effort should be made to develop professionalism of signal corps personals on ICT and communication field through training and workshop or seminar with other communication agencies.

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