INTEGRATION OF NON-MILITARY AND COMMERCIAL FACILITIES TOWARDS ENHANCED COMMUNICATION FOR BANGLADESH ARMY

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Introduction

Communication is the key element to maintain effective Command and Control (C2). Success of any military operation depends on maintenance of reliable and uninterrupted communication. As such, secured and reliable communication has no alternative. Bangladesh (BD) Army has its own military means of communication which are not enough both in quantity and quality, and lacks in alternative means too. Existing military communication means are also highly susceptible to hostile Electronic Warfare (EW) activities. With the increasing demand of making military decision cycles shorter, and given the lack of strategic depth in the country, the need for having efficient communication systems has become more important for BD Army than ever before. The global trend of 'convergence of systems' necessitates that the communication systems must be planned considering the entirety; the implementation may be orchestrated through decentralisation[1].

BD Army takes support of commercial communication resources to facilitate its peace time communication. A good combination of several means of communication enable the military to conduct operations smoothly. It also includes appropriate utilisation of non-military and commercial communication resources. Proper exploration and integration of these resources is likely to enhance the ability in providing and maintaining communication both during peace and war. Integration would also provide reliability and redundancy in military communication system. The best possible integration is the sharing of communication resources during peacetime, the transition of which is automatic during war. National communication resources has a good prospect to be of great value for utilisation by BD Army, if coordinated and integrated appropriately[2].

1. Bari, E. U., 2013. Forces Goal 2030 : Restructuring Corps of Signals, Dhaka: Concept Paper, 86 Independent Signal Brigade.
2. Khan, S. A., 2008. Integration of National Communication Resources to Enhance the Operational Capability of Bangladesh Armed Forces. National Defence College Journal, 7(1), pp. 159-183.

Integration of national resource for communication being so prospective, still exists in theoretical domain only. There is no functional estimate, planning, coordination and clear policy guideline on the subject. Therefore, to ensure enhanced communication capability, few steps are essential like; establishing need for integration, exploration of suitable resources available, likely challenges and ways to mitigate, operational modalities for effective integration and need for appropriate policy formulation.

Proper integration is going to complement the military communication to a great extent and serve as a redundant communication means. Therefore, the prospects and likely challenges for integrating communication resources needs to be found out. Subsequently suitable options of integration and a viable action plan also needed to be determined. This paper focuses to examine and explore possibilities and challenges of integrating existing non-military and commercial resources with military communication system with a view to enhancing communication capabilities of BD Army. Besides, endeavour has been also taken to find out credible operational modalities for integration, which would be conducive for uninterrupted, reliable and secured communication. The study also leads to requirement of policy guideline at both national and army level.

Analysis of the Existing Communication System of BD Army

Existing Communication Framework

BD Army has two types of communications namely field and static communication. When any formation is deployed out of the cantonment, field communication is provided through various military means. Besides, all the cantonments are connected by static communication through various static communication links. The voice communication depends on the radio equipment, radio relay (RR) links and telephone lines in a field communication system. Data communication depends on Bangladesh Telecommunications Limited (BTCL) and other Nationwide Telecommunication Transmission Network (NTTN) backbone. Dispersion of the forces deployed in any formation Area of Responsibility (AOR) suggests that it is difficult with existing military resources to support the operational plan of the formations[3].

3. Brigade, Army Signal. 2005. Integration of National Communication Resources to Augment Military Communication: Prospects and Challenges, Dhaka: Formation Project Study Paper 1/2005.

There are many tangible and intangible reasons for which our communication system could not develop. Economic and technological aspects are the two most prominent barriers. Due to which other causes surfaced like: inadequate infrastructure and modern communication equipment, lack of communication security measures, absence of EW capability, interoperability issue of communication equipment of varied origin/ type and technical expertise of operators and technicians[4].

Options Available to Enhance Existing Communication System

A survey was also carried out to explore options available to overcome limitations considering the economic reality. Where few effective ways were found like; acquiring modern communication equipment, indigenous production of communication equipment, acquiring modern EW capabilities, developing operators/ technicians' expertise and taking support of other communication facilities available in the country. Most of the respondents opined for taking support of external communication resources as a viable short-term option.

The most suitable solution for backbone between the highest headquarters and field formations is Fiber Optics (FO) backbone. Instead of laying new FO cable by the Army, integration of laid FO by public and private agencies is the easiest solution. However, terms and condition, reliability during crisis and security are to be ensured. Standardization of protocol and interfaces are important so as to enable connecting the interfaces for quick connectivity and safeguarding resources once needed. However, military must plan independent communication and may be it will take long time. The transition period may always be covered by patching the civil communication.

Need for Integration

Historical Perspective: During the Gulf War 1991, the strategic, operational and tactical communications were duplicated by the high quality civilian landlines. Besides, commercial satellite communication and international landlines were integrated with the military communication to bridge the gap. In the Battle of Grozny (in the year 1994), civilian communication system (mobile communication network) was used along with military communication both by the Russian Army

4. ibid.

and Chechen rebels[5]. Thus study of contemporary military history suggests that integration of civil communication resources act as an aid and multiple communication means for conducting the military operations.

Global Trend of Integrating Commercial Resources with Military Systems: To meet the modern military communication requirements, presently other advanced military forces in the world are also utilising commercial resource to minimize cost, better service and as an alternative means. In case of US forces in Iraq, given this enormous increase in theatre bandwidth requirements for the operation, it is no surprise that MILSATCOM[6] alone could not meet the full need and that commercial SATCOM was heavily relied upon. The launch delays of organic military communication satellites, combined with burgeoning operational needs, have caused the military to increasingly rely on commercial SATCOM. Commercial sources accounted for approximately 60 percent of SATCOM provided in Operation Enduring Freedom and 80 percent during Operation Iraqi Freedom[7].

Integration is for Both Peacetime and War: During peacetime, integration helps to train the communication personnel and users to extract the benefits of the communication system. Quite often Army is deployed for operations other than the war, where for better command, control and communication (C3), an integrated communication system is essential. During war, a superior enemy is likely to target C3 elements at the outset of hostility. Communication infrastructures above the surface are likely to be damaged. As such, maintaining unhindered communication during war will be a key factor with available resources. Considering the existing technological and financial constrain; to ensure secured and reliable communication for BD Army, in a short/mid-term timeframe the best alternative is to take assistance/ integration of military communication with existing commercial resources. Sooner we start doing it, is better[8].

Policy Guidelines Related to Integration of External Resources

Current Provisions: During any emergency or during war, eventually all the national resources will be extensively used by the military for an effective war

5. Khan, S. A., 2008. Integration of National Communication Resources to Enhance the Operational Capability of Bangladesh Armed Forces. National Defence College Journal, 7(1), pp. 159-183.
6. MILSATCOM means Military Satellite Communications; "SATCOM" is an acronym of, and generic term for, satellite communications.
7. Forest, B. D., 2008. An Analysis of Military Use of Commercial Satellite Communications, Montery, California: Naval Post Graduate School.
8. Farhad, S. M., 2016. Integration of National Commercial Facilities to Enhance Communication of Bangladesh Army [Interview] (30 Jun 2016).

fighting outcome. However, until now, there is no such written policy which allows the military authority to exercise control over the commercial entities for the purpose of national requirement. In reviewed Telecommunication Act 2011, Clause 41.03 explains the conditions for which government can take the control of mobile operators for the sake of national security. But the act does not clearly specify the definition of the Government to include military or defence forces. A formal request was forwarded from Armed Forces Division (AFD) about the matter, but yet no significant response is obtained from the Government. Therefore, a holistic approach is needed once again from AFD so that Bangladesh Telecommunication Regulatory Commission (BTRC) is taken on board for updating the policy and also enforcing the same on to the licenses for strict compliance[9].

Ways Ahead: Communication integration planning during peacetime should be aimed towards communication support during war. License agreements of various mobile operator and NTTN agencies needs to be studied to find out their obligations to support armed forces during war. Telecommunication Act 2001 needs to be studied to form idea on regulatory aspects to carry out study in further details. BTRC would be the lead organization to formulate the required policy on communication resource sharing/ integration.

Advantages of Integration

Integration will save substantial cost in comparison to have independent communication infrastructure of individual organization and development of technical expertise in the field of integration. A specific model for integration like, Switching Cen Concept need to be identified for overall planning and implementation; in line with a 'Holistic Approach' for integrated communication system[10]. As discussed earlier that, military communication can be enhanced by appropriate integration with non-military and commercial communication systems.

It is obvious 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:

9. Towhidul, I., 2014. Utilization of Commercial Facilities for Military Communication: A Bangladesh Perspective, Dhaka: AFWC-2014, National Defence College.
10. Zaman, M., 2016. Integration of National Commercial Facilities to Enhance Communication of Bangladesh Army [Interview] (12 July 2016).

- Will ensure better service through a single system.
- Serve as a multiple communication system for the AF and also become an alternative means of communication for the armed forces during disaster management and emergency.
- Will save substantial cost in comparison to have independent communication infrastructure of individual services.
- Will avoid duplication of effort by individual services.
- Will meet present communication requirements and also have the expansion facilities for future requirements.

External Resources Suitable for Integration and Associated Challenges

Non-military/Government Resources

Border Guard Bangladesh (BGB): BGB being deployed in the front will be able to provide early warning by own means of communication. Their maximum Radio Sets are compatible with BD Army used radio sets. Any deployment near BGB sector/units will have alternative means of communication. It can be deduced that BGB communication assets can be integrated with BD Army resources very easily and can increase overall communication efficiency of BD Army.

BD Police: Communication infrastructure of Police is the widest among all organizations of BD. They have remarkable development in the last few years. Police Telecommunication Organisation's (PTO) facilities if integrated properly then there may be redundancy of communication for military use. The sophisticated communication repair workshops at Dhaka and in major districts can also be utilized in case of need.

Rapid Action Battalion (RAB): RAB has fast, efficient, secured modern communication and Management Information System (MIS) network including wireless telephone communication. It uses land based communication for land telephone/ fax from BTCL and uses corporate client facility of GP for mobile use. RAB has independent HF system for long distance wireless communication with battalions and independent VHF system for short distance wireless communication within battalion. The integration with RAB requires incorporation of terminal equipment at the subscriber end with minimum accessories by the Army.

Commercial Resources

Bangladesh Telecommunication Company Limited (BTCL): BTCL has the biggest infrastructure of communication network through Fibre Optic (FO) cable link, overhead lines and microwave links as national backbone covering all districts and upazillas of BD. BTCL provides digital exchanges up to most of the upazillas of the country. Army needs to depend on BTCL for peace and wartime communication through dedicated fibre optics backbone. BD Army is highly dependent on this agency. The huge FO network all over the country will assist to get reliable support and redundancy of communication. Above all, appropriate representation from defence at the policy making body of BTCL is required to deal with the planning and development of the communication means and resources.

Bangladesh Railway (BR): BR is the first organization to introduce optical fiber communication in the country. BR communication network covers a distance of more than 2900 km through FO links spanning the entire country[11]. The network is connecting nearly 250 railway stations for BR's own use. BR also provided its FO cable for use to Grameenphone (GP) as rent. In recent years, GP has upgraded almost 1600 kilometres of the old FO network of BR[12]. Communication infrastructure of BR is a vital sector of our country. Due to expansion of secured fibre optics network to railway stations, Army may integrate the resources in the likely deployment areas to meet future operational need without disturbing the railway communication and GP network.

Other NTTN Companies: Fiber@Home plays a major part in the communications sector in BD in providing better services in telecommunications. They established more than 6832 km optical fiber long haul backbone covering 23 districts, connecting Dhaka with Chittagong, Sylhet, Bogra, Rajshahi, Jessore and Khulna. Summit Communications Limited (SCL) being a NTTN provider, provides customized and integrated transmission solutions through fibre optic network as the country's premier infrastructure solutions provider. SCL has built access to 13,200 KM network and has an ambitious plan of 100% nationwide coverage by 2017. Power Grid Company of Bangladesh (PGCB) has installed OPGW (Optical Ground Wire) on high voltage transmission line to protect the transmission lines from thundering. This technology of placing optical fibre

11. Rana, M. M., Islam, M. N., Morshed, K. M. & Hossen, M., 2008. Fiber-Optic Communication in the Context of Bangladesh. International Conference on Electronics, Computer and Communication (ICECC 2008), 1(1), pp. 210-213.
12. Cellular News, 2008. Grameenphone Starts Upgrading Fibre-Optic Network Back Bone. [Online] Available at: http://www.cellular-news.com/story/28927.php [Accessed 25 October 2016].

within the ground wire is being widely used throughout the world at present. PGCB is using some small portion (10 percent) of the FO network capacity and the remaining portion remains spare after meeting different needs of PGCB.

Mobile Phone Operators: BD has six major non-government mobile phone operators namely Citycell, GP, Teletalk, Banglalink, Robi and Airtel. Amongst these, the mobile network of GP has almost entire country coverage. It has the largest number of Base Terminal Stations (BTS) and Master Switching Centres (MSC) around the country. As of March 2016, BD has 128.939 million subscribers in total[13]. Army is already using mobile operators' corporate package as end users. In emergency, their links can be utilised as alternative means to establish communication. Besides, Mobile Virtual Network Operator (MVNO)[14] project for BD Army is under active consideration which will help army users to use mobile phone facilities all over the country using a unique prefix number. This will ease phone usage and ensure significant cost reduction on official mobile phone bill.

Likely Difficulties in Integrating External Resources

Technical expertise of military communicators, breach of security, endpoint patching equipment, compatibility/ interoperability and absence of access points were found to be the major impediments in conducting smooth integration. Exploring and maintaining an updated database of available communication facilities in different geographical location would be necessary. Communication integration plan needs to be in line with the operational plan of various field formations in different phases of operations. Integration seems to pose some difficulties in practical approach. Following are the likely difficulties which may be encountered during integration:

- Absence of a specific policy guideline by the government and the Armed Forces on use of national communication resources in terms of training, utilization, coordination, budgeting aspects, etc. Besides, BD does not have a national communication policy integrated with the military communication system.
- For an effective communication integration, availability of suitable access-points, updated communication information and technical data, necessary interface equipment, technical expertise of the related personnel and appropriate

13. BTRC, 2016. Mobile Phone Subscribers in Bangladesh March, 2016. [Online] Available at: http://www.btrc.gov.bd/content/mobile-phone-subscribers-bangladesh-march-2016 [Accessed 13 July 2016].
14. MVNO is a service provider that sells secured mobile phone service by making use of another company's existing network infrastructure.

cooperation/ agreement between concerned parties are essential[15]. While integrating external communication resources with military communication, absence of one or more of the above essentials may pose difficulties.

- Existing communication equipment of BD Army has varied origin and types, which are not inter-compatible. Therefore, in any future need, it will be difficult to bring required national communication resources for military use and utilize to its maximum efficiency due to multiplatform communication means and their compatibility issues.
- Even in war, the other organizations will remain functional; as such there is a need to assess the resources that can be actually spared for the Army during peacetime.
- Military communication is sensitive due to security classifications and it needs to be reliable. COMSEC is of prime importance for military communication system. Therefore, the biggest challenge of communication integration is to ensuring COMSEC, which includes important three security aspects like Transmission Security, Emissions Security and Physical Security.

Modalities of Integrating External Resources with Army Communication System

Concerns Related to Integration

Security Issues: Military requires secure means of communication. And for that reason, integration of civil communication resources is likely to face some challenges as discussed earlier. Communication security will be the influencing factor for any decision of integration method. For our Army, the general advantages of utilising national communication resources are remaining in touch with current communication system/ equipment and training of the communication personnel to remain updated.

Technology and Knowledge Sharing: The integration of civil-military communication resources should be as such that during war it can enhance the capability of our Army communication. And during peace time, it should complement each other in terms of resource, knowledge and expertise sharing. It must be remembered that civil communication resources can only augment military communication and thereby, it can enhance the operational capability of our forces.

15. Brigade, Army Signal., 2005. *Integration of National Communication Resources to Augment Military Communication: Prospects and Challenges,* Dhaka: Formation Project Study Paper 1/2005.

Permanent Communication Infrastructure and Access Points: Maintaining flawless communication in peacetime as well as during war is a prime requirement for best possible integration. Army should have a permanent communication infrastructure which will meet the requirement both in peace and war. The communication resources available in the country have already been discussed and there is only need of planning, coordination and integration at the national level to multiply the existing resources into a larger communication asset. Besides, for the integration planning purpose there should be some national policy to select potential access points around the country to get connected with the communication systems earmarked for use by the Army.

Suggested Action Plan

Like other countries in the world/ region, BD Army need to plan for Communication Switching Center concept. Integration of endpoint equipment and availability of access points in the area of operation will be a great challenge. For effective integration we need to have up-to-date database of all existing essential communication resources. Besides, involvement of military representative in the future communication infrastructure development is important. National policy framework is required for effective integration. Top-down approach would be the best in this case. Thus, integration will ensure judicious use of costly infrastructure and also ensure economy of effort. Analysing the options in various mentioned aspects, following action plan is needed to be executed:

Formulating Policy: Presently there is no clear policy regarding the use of national communication resources during emergency. Therefore, a policy needs to be immediately formulated. Proper guideline is to be given at the topmost level of all agencies with appropriate directives. A coordinating body in AFD may coordinate this entire effort through BTRC and all other organisations. Army Headquarters (AHQ), Signals Directorate, Armed Forces Division and Ministry of Post & Telecommunication are major stakeholders for planning and implementing communication integration process. Lead has to be taken from Armed forces to match the existing network of different NTTNs in line with operation plan, and also should have adequate mechanism to influence/ ensure future network expansion of NTTNs are complementary to defence need[16].

16. Bari, E. U., 2016. Integration of National Commercial Facilities to Enhance Communication of Bangladesh Army [Interview] (23 August 2016).

Maintaining Updated Information: A database is to be maintained at appropriate level and 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 organisation.

Enhancing Professionalism: Continuous effort should be made to enhance professionalism of all members of Army communicators. It has been seen that there is a lack of technical knowhow in handling latest sophisticated communication equipment. Improved technical knowledge will assist in planning and integrating national communication resources.

Integrated Effort by Related Agencies: Few projects are already undertaken to enhance joint military communication. Likewise, more steps may be undertaken through joint services communication projects. Thereby, inter-operability will increase to a great extent and it will be easier to carry out joint operations. In a broader framework, if this integrated approach can be contemplated with national communication agencies, it will further economize the entire national effort.

Integrate Military Forces in Developing Future Communication Infrastructure: Unplanned development of communication infrastructure may be a threat to national security. Development in the communication sectors by any organisation should properly be coordinated with military authority. It will also economize the entire national effort and enhance the security of the nation. Communication infrastructures are planned and developed after consultation with the military across the world.

Enduring Engagement with Other Communication Agencies in Civil Sectors: Regular engagement in the form of seminar, workshop etc may be organized with national communication agencies to enhance technical knowledge and to keep abreast with the latest developments in the field of ICT.

Recommendations

After unearthing the huge national communication resources and analysing viable options for integration, few recommendations are made. These recommendations are broadly divided into two categories as, Policy Level and Functional/ Operational Level recommendations. Details follows:

Policy Recommendations

- Policy on Integration of National Communication Resources at the National Level. Appropriate policy needs to be formulated at the highest level on integration of external communication resources for both during peace and wartime. Related policies also to be formulated for BD Army in coordination with AFD and Ministry of Defence (MOD). Besides, a coordinating body need to be organized for looking after the implementation of external communication resources integration.
- Military Representation in the Communication Policy Making Body at the National Level. To ensure defence and security requirement, and implementation of issues related to national communication resources, military representatives of appropriate status may be placed in Ministry of Post and Telecommunication and Information Technology (MoPTIT), BTRC and other related apex organisations.

Functional/Operational Recommendations

- Establishment of Switching Centres. During peace time BD Army should establish permanent switching centres. These should be prepositioned near the probable deployment areas of operational field formation/units. Nodal points of suitable communication service providers in the formation area should be earmarked and updated regularly so that the communication facilities can be utilized during any emergency.
- Maintain Updated Database. BD Army need to prepare and maintain database of available communication resources in the respective AOR of various field formations. This database need be updated and required field test/ exercise also to be done as per operational plan with a view to get maximum benefit out of it during emergency.
- Joint Training Exercise for Technical Skill Development. To develop technical know-how, communication personnel need to remain updated with the technology used by the external communication providers. Regular training exercise and coordination with available facilities and required interface devices will make them conversant and develop expertise in this field.
- Implementing Pilot Project on Integration of National Communication Resources. After attaining a workable policy level development on integration aspect, pilot projects may be taken up in any of the suitable field formation areas, with a view to test, validate and implement the integration concept in a wider extent for the entire army.

Conclusion

The existing communication system of BD Army has limitations in respect to infrastructure, technology and communication security. Weakness in tactical communication, central network backbone, EW capability, repair and maintenance, and absence of redundancy in communication systems were found to be the major limitations. There are many tangible and intangible reasons for which our communication system could not develop. Economic and technological aspects are the two most prominent barriers. While exploring a cost-effective solution to cover the above weaknesses, integration of external resources with military communication surfaced as the most viable option. It is perceptible from the existing communication system that, BD Army has the prospect for enhancing operational capability by integration of non-military and commercial communication system.

The significant findings for integration are: better service, reduction of cost, redundant communication means and compliance with organizational need. In the study it has been found that, government policy guideline though indicates integration of national communication resources, but a clear cut guideline related to integration with military communication is absent. The study of the integration of civil communication resources with military network reveals that, it is very a significant issue which deserves careful consideration from all corners. The overall picture shows that the country has enough communication resources to meet any emergencies. Study makes it evident that the BD Army would have number of options available in addition to their existing communication means.

The major challenges of integration are incompatibility of communication systems, lack of skilled manpower, insufficient security measures, absence of relevant training, and insufficiency in doctrinal aspects. 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 area switching centres with the help of countrywide optical fibre network may be chosen as an option for physical integration. Finally, after unearthing the huge national communication resources and analysing viable options for integration, few Policy Level and Functional Level recommendations are made. Apposite implementation of the recommendations will ensure smooth integration so as to enhance communication capability of BD Army.

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