Poor Mapping by Military Survey

By Lt Gen Prakash Katoch
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Last month the military ordered a study to reorganize the Military Survey. The need to reorganize this veritable British legacy monolith was never more. There is but one intriguing element; why re-invent a wheel when you already have one. A similar military study for reorganizing Military Survey, headed by an outstanding two star rank officer, was ordered, completed and approved in full during 2009. How Military Survey has bypassed the system and buried this study is the question military should be asking. The operationally urgent recommendations of this study should have been completely implemented over past four years but this did not happen. Not only was this study quietly buried, ordering of the new study was done the day after the officer who had headed the 2009 study hung up his uniform, which happened on 31 May 2013 when the officer (Army Commander by then) bid adieu to the Service.

Military Survey is required to meet mapping requirements of the Army, Navy and the Air Force. It also provides maps to the Para Military Forces, Central Armed Police Forces and Police units on demand from the Ministry of Home Affairs. Factually, Military Survey is unable to meet existing military requirements. Even in technology adaptation, Survey of India (SoI) has gone way ahead of Military Survey, whereas, it should have been the other way around. As a result, Military Survey products are primarily Google based maps, that hardly measure up to military requirements. There is no movement towards developing and introducing a Geographical Information System (GIS) for the Military, a requirement that Military Survey should have met a decade back. SoI and Military Survey are British legacies that were meant to consolidate territories of British Empire in India. The then requirements are totally different from what is required today.

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The Map Policy of India is explicit that mapping within India is the responsibility of SoI but Military Survey more advertently than inadvertently gets involved more and more internally, rather than focusing on trans-border mapping requirements. A major reason for this is the system of ‘reverse deputation’ that Military Survey had with SoI, which should have ceased decades back. It is because of this ‘reverse deputation’ that the Military Survey draws its clout from the Ministry of Science and Technology that can be manipulated at will, circumventing both the Ministry of Defence (MoD) and the Military.

When the IPKF went into Sri Lanka, maps with our military were by far inferior to those of Sri Lankan Armed Forces. Today, the situation is unlikely to be different. Incidentally, when our military went into Maldives, all planning perforce was on a tourist map provided by the R&AW Chief. Presently, Military Survey is 30 years behind in meeting existing routine mapping requirements of the Military, whereas Large Scale Mapping requirements of say 1 : 5,000 and below is practically not being met at all, which are vital to operational information systems being introduced into the army. It is very much possible to prepare accurate base map larger than 1:10,000 scale. The development of a specific methodology for preparation of such large-scale map with the use of advanced technologies such as Remote Sensing, Global Positioning System and GIS in an integrated way is the need of the hour. Looking across the Indo-Pak border one can see whole villages not shown on Military Survey maps.

In 2004, Military Survey was brought under the newly created Directorate General of Information Systems (DGIS) of the Army under express sanction of the Defence Minister to ensure inclusive development and deployment of Operational Information Systems (OIS), Management Information Systems (MIS) and the GIS. The need to shift from Platform Centric Operations to Net Centric Operations had brought into focus vital issues. Net Centric Warfare (NCW) has the critical requirement for integration of operational and tactical information and knowledge with reference to terrain for precise targeting. Battlefield management requires coordination between units, formations, other services and multiple Government agencies. Real time geographical visualization of the battlefield scenario on a network is required that is possible through exploitation of geo-spatial data from multiple sensors obtained from space, aerial, ground, sub surface and other platforms.

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Commonality of data and standards for Defence Services is an imperative. The tasks assigned to Military Survey included trans-frontier mapping, updating maps with satellite imagery, creation of Enterprise GIS, creation of Digital Topographical Data Base, preparation of Defence Series Maps (DSMs), Large Scale Mapping, training on GIS and attribute data collection, photogrammetric survey and remote sensing, and the like. For Military Survey, the requirement to establish Enterprise GIS became paramount, as also did the requirements of trans-frontier mapping and large scale m to meet increasing demands of upcoming OIS. The need to establish a Defence Spatial Data Infrastructure (DSDI) had also become apparent with the National Spatial Data Infrastructure (NSDI) coming into being.

Military Survey had expanded over the years with Centre for Automated Military Survey (CAMS), Army Digital Mapping Centre (ADMC), Defence Institute for Geospatial Management & Training (DIGIT), a Field Survey Group and a Ground Air Survey Liaison (GASL) Platoon, latter providing aerial cover for survey. However, the organization had gone somewhat in comma. The system of “reverse deputation” with SoI had been put on hold for a decade plus perhaps on purpose. This created additional two star vacancies for Corps of Engineers officers in SoI with the added advantage of comfortable peace time office work. The effect in the Military Survey was equally lucrative, with officers continuously serving from 7-10 years within Military Survey. Such officers especially in the one star rank displayed little initiative. The Corps of Engineers did not send young officers to undergo survey training till they had physically reported to Military Survey on posting. When a move was made to re-start the process of reverse deputation, SoI intimated they could only make available officers of Major General rank to replace Brigadier and Colonel level rank officers in Military Survey. This indicated that the Corps of Engineers had outplayed other sister Corps in having a far greater number of Major General rank officers by stalemating the reverse deputation gimmick for protracted number of years.

The placement of Military Survey under DGIS in 2004 should have been for ‘all purposes’ but this unfortunately was not done. The lopsided arrangement was that the Ministry of Science and Technology was in the chain of reporting on the annual confidential report of the officer heading Military Survey and Technical Control was with Engineers Branch. Postings of officers to Military Survey were done by the Military Secretary’s Branch in conjunction the Engineers Branch. Prior to merger with DGIS, Military

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Survey was in Military Operations Directorate, where the Engineer-in-Chief's (E-in-C) Branch considered it its "Fourth Pillar".

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Merger of Military Survey with DGIS brought out a host of shortcomings, some of which were: techniques used for production of maps were archaic; Google maps were downloaded as base data; more focus on own side of the border compared to trans-border mapping; organizational focus (following the British legacy) was on physical survey, however, this had not been done for decades in counter-insurgency areas of J&K and in the north-east despite army presence; demands for satellite imagery were forwarded to Defence Imagery Processing and Analysis Centre (DIPAC) through Military Intelligence but were never followed up and Defence Series Maps (DSM) were being prepared without incorporating satellite imagery; patrol reports of difficult areas were ignored for updating maps; the Field Survey Group and GASL Platoon at Agra, with Air Force providing aerial sorties, basically met requirements of SoI as the aircraft fly 10 kilometres own side of the border but SoI was charging money for maps it gave to the Military Survey but in turn was not being charged for the air sorties and the related establishment; little / no efforts were being put in towards digitization of maps integrating satellite imagery and photography, exploiting advanced technologies and introduction of a GIS; no GIS policy and common symbology for the three Services had been evolved; there were sustained voids of survey trained officers in Military Survey spanning over a decade.

With the aim of introducing an Enterprise GIS, a tri-Service study was ordered by DGIS during late 2007. This took inordinately long due to resistance and avoidable delays by the Engineers Branch who claimed this was their turf. However, once this tri-Service study was concluded, a GIS Policy with Common Symbology for the Military was issued in 2009. A Request For Proposal (RFP) to establish an Enterprise GIS was floated by DGIS in mid March 2009 but has still not seen the light of the day while learning the ropes from the Army the BSF and CRPF introduced GIS in the years 2008 and 2010 respectively. As mentioned above, a military study to reorganize Military Survey was ordered in 2009. Study members included representatives of the Military Secretary, Military Intelligence, Engineers Branch, Military Survey, PMO Battlefield Surveillance System (BSS) under DGIS, DIPAC, Naval Intelligence and Air Intelligence. Main issues to be addressed by the study were: reorganization of Military Survey Units in the backdrop of available global technology and modern techniques; examine existing system of mapping, map updating, digitization and how updating can be speeded up through reorganization; examine role of military Survey in attribute data collection; officer management; rationalization of existing manpower; changes in present trade structure; human resources development and present training capability, need for establishing Defence Spatial Data Infrastructure (DSD) and road map for proposed restructuring.

Some of the findings and recommendations of this study were: Military Survey's archaic mammoth organization (authorized strength of 112 officers, 319 Junior Commissioned Officers, 1033 other ranks, 89 civilians) in no way met military requirements; DIGIT was functioning on ad hoc basis with very limited capability; units of Military Survey were functioning on different structures with varying capability, which need to be addressed; with same roles, there was duplication of manpower and equipment between the GIS Cells of Military Survey at Command, Corps and Divisional Headquarter levels (totaling 4 officers, 78 JCO's and 322 other ranks) and the IITs working under General Staff Branch of respective HQs (totaling 98 officers, 145 JCOs and 119 other ranks); GIS Cells at Formation HQs were mere storekeepers of printed maps; amalgamation of the GIS and IIT Cells was warranted for considerable savings in manpower, equipment, costs and improving efficiency; vital requirement to change Military Survey into an All Arms organization and replace Military Survey officers at the field formation level by All Arms officers; numerous trades in Military Survey could be reduced to two; Military Survey must visualize future operational requirements and

cater infusing new survey equipment and technology; emerging technologies like Digital Photogrammetry using digital aerial photo / High Resolution imagery / UAV inputs, mobile data capture in field using PC tablets, gravity and geo-magnetic surveys, Airborne Laser Terrain Mapping (ALTM) / Light Detection & Ranging (LIDAR) survey, on-line data transfer for updation / web enabled services, GIS applications and services, Digital Cartography and hi-tech digital planning need to be incorporated; reduce periodicity of updating of maps to 2-3 years from current 10-15 years; large scale mapping is must for NCW requirements; establishment of the DSDI is essential preceded by Enterprise GIS; part of manpower saved on account reorganization be used to set up DSDI.

With the above ongoing study, alarm bells started ringing in the Engineers Branch with visions of shrinking turfs. A hurried conference was organized under aegis of the then Vice Chief of Army Staff who himself was from Engineers. The Engineers Branch put up a case that Military Survey should be moved out from DGIS, DIGIT from its present location in Delhi Cantt to Secunderabad on the plea that DIGIT could interact with civil engineering colleges there and that system of reverse deputation with SoI should stay since Military Survey can approach Ministry of Science and Technology directly (circumventing MoD) for foreign trips – courses, visits / exchange visits etc. However, none of this could be pushed through. As regards the reason being given to move DIGIT out, it was pointed out that there are numerous civil engineering colleges in Delhi-NCR as well. Despite these hurdles, the Study for Reorganization of Military Survey was approved. However, it appears Military Survey in conjunction Engineers managed to freeze it save some movement on rationalizing and reducing the numerous trades in Military Survey.

What Military wants to do with Military Survey is entirely their business but move out of Military Survey from DGIS is a retrograde step that will adversely affect the Military acquiring NCW capabilities and needs to be reversed.

Then one fine morning in 2011, DGIS received orders that Military Survey is no more under them and has been placed under Military Operations. As rumour goes the Vice Chief from Engineers while demitting office had extracted a promise from someone to revert Military Survey back from DGIS to Military Operations for reasons quite apparent – retain Engineers turf. Ironically the move orders were issued only after Military Survey had moved into and occupied a complete floor of the brand new building of DGIS in Delhi Cantonment; creating a situation where Military Survey shows two fingers to DGIS. What is relevant here is that in the instant case move of Military Survey under DGIS in 2004 was under the express sanction of the Defence Minister to ensure synergy of OIS, MIS and GIS. As such, its reversion should have had the sanction of the MoD which was apparently avoided. Post move out from DGIS, Military Survey has washed off its hands from progressing Enterprise GIS on the plea that it is a General Staff (GS) issue. This is despite that it should actually be their bread and butter, they are now part of Military Operations which is the topmost GS Branch and Military Survey itself is in the old cocoon of MO (GS GS). Presently, Military Survey is back to its leisured engagement of paper maps and continues to be 30 years behind military requirements even in this sphere.

What Military wants to do with Military Survey is entirely their business but move out of Military Survey from DGIS is a retrograde step that will adversely affect the Military acquiring NCW capabilities and needs to be reversed. MoD intervention is certainly warranted. The Army needs to find a solution to obviate in-Service bureaucracy and give precedence to overall capacity building over consolidation of individual reorganization. Chinese media reports that Xi Jinping has got after the PLA and police practicing hedonism and lackadaisical functioning. The MoD and the Military

need to take a call on shaking up Military Survey and implement its reorganization in line with the 2009 study. In addition, the following merit serious consideration:

- Survey of India and Military Survey both meant for meeting security requirements of the nation are neither under the MoD or MHA. This needs rectification. Military Survey and SoI need to be brought under MoD and MHA respectively.
- Military Survey (converted to All Arms organization) should be brought under the MoD through Integrated HQ of MoD (Army) with physical placing under DGIS for all purposes, Similarly, Survey of India needs to be brought directly under the MHA.
- Circumstances under which British started the process of "reverse deputation" by officers of Military Survey to MHA do not exist anymore. There should be a vertical split between Military Survey and Ministry of Science & Technology, with "reverse deputation" replaced by a simple three years deputation with SoI.
- Not only should Military Survey be made an All Arms organization, it should be headed by a General Cadre officer, preferably who has commanded a Division, to give the organization required operational direction.
- An in-depth analysis is required to meet mapping including large scale mapping, digitization, imagery and GIS requirements of the Military keeping in mind the fielding of OIS and enhanced missile ranges, and a road map worked out to leapfrog mapping voids.

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At the national level, we also need to address two issues: first, the National Map Policy 2005 defines two series of incompatible maps (only country in the world to do so); Defence Series Maps (DSM) based on WGS 84 / LCC and Open Series Maps (OSM) based on WGS 84 / UTM. There is no mention anywhere of the elevation system to be used – whether it should be WGS 84 or another. Moreover, the policy does not cover the nautical and aeronautical charts. The policy is restricted to small scale maps and is silent on responsibility for attribute collection. The overall implications are that we have two incompatible projections and associated different grids are an operational nightmare; second, as per the Remote Sensing Data Policy 2011, the National Remote Sensing Centre (NRSC) is vested with the authority to acquire and disseminate remote sensing data. All data of resolutions up to one metre is distributed on a non-discriminatory basis. All data better than one metre resolution is to be screened and cleared by appropriate agency prior to distribution. This policy also talks of specific sales / non-disclosure agreements for data better than one metre resolution. The implications of this policy are that it places undue restrictions on genuine users for the simple reason that point five resolution data is available in the public domain through Google Earth etc, implying much better spatial data is available in public domain and by extension to our adversaries.