Digitizing the Battlespace" - Buzz Word or Planning Concept ?
Part 2

If the conceptual framework of socio- technical- system is true for any information system then the question of outsourcing of military IT-know-how can't be answered easily. Based on above described experience, the one task of developing a coherent concept for IT/DP training is now being tackled with great commitment in most armies. The need for a conceptual directive became obvious in order to implement a "modular" structure of the lessons/training courses and in particular "integrated training", which means that information technology is rather considered to be a training method than a training subject. This would largely provide for the efficient employment of resources and personnel and the integration of information technology into the existing training system. The "tool-character" of IT must never be forgotten. In a nutshell, military mission-oriented IT-training as well as overall IT-support is a military objective, which means military action including information technology. Very clear, to a high degree IT-handling it's a soldier's business!

In fact, our training considerations relate to the whole personnel affected by the employment of information technology. And which organizational position will not be affected by the utilization of information technology in the future? A simple but helpful classification of the personnel according to "levels of IT involvement" serves to distinguish target groups as follows:

- Personnel affected by information technology, i.e. passive users of IT products,
- Active users of information technology as part of their jobs

  (The major part of the Army personnel fall into these two groups.),
- Planners/decision-makers for IT design, organization and administration,
- IT experts, i.e. for example information specialists, programmers and network system managers,
- Instructors.

The transitions between the individual groups will be fluid, as the military skills of an individual soldier will always be more or less combined with specialized or expert IT knowledge. However, this classification obviously spans a wide range of future qualifications and training requirements, which I addressed earlier by referring to the personnel of the superstructure and substructure of IT employment.

In particular, it should be mentioned that the large group of planners and decision-makers or, in military terms, of the commanders and principal staff personnel, is included in the IT involvement scale. If the introduction of information technology, i.e. the digitization process, is not to have a subversive character and lead to organizational problems, the commanders and principal staff personnel must be prepared and able to organize their areas of responsibility including that of information technology use.

- Information management is a commander's responsibility! -

It cannot be left to the IT technicians!

Apart from the aspect of qualification and training, the provision of personnel has a structural aspect. An army as any other organization has to make the acquisition of IT expert knowledge in line with the above-stated levels attractive for the individual soldier. Any army, just like other organizations, will thus have to provide special career opportunities for experts, if only to limit the loss of information specialists who have undergone several years of expensive training. Expert knowledge is indispensable for analysis, configuration and project management as well as software maintenance

processes at least in dealings with materiel developers and industry. The military should keep his skills and ability of controlling the industrial vendor. Otherwise the army runs out of control of itself.

In any case, past experience has shown that line officers who are trained as data processing officers in one single comprehensive training course will hardly be able to acquire well-founded and thorough expertise. Through integration of the basic personnel organization, an army would organizationally take account of the overarching, integrated character of information technology. Such an approach would strengthen the concept of integration, if the individual command and control support tasks were not only given appropriate weight by upgrading them but were also combined in one organization. We believe that the further development of the signal corps offers the chance for combining all digitized services and forming the core of a command and control support service or a communications and electronics service. From the professional and sociological points of view, it seems quite important to provide all those concerned with a military home to identify with.

Top-Down Approach

The idea of integrated command, control and information systems and of a uniform, overarching command and control support concept is also clearly reflected by the actual equipment projects of NATO armies. In all cases you will find the goal to coordinate projects for the sake of integrating data, functions and applications in terms of contents and technical design and standardized to the maximum extent possible. The ultimate idea is being called "interoperability" of CCIS and BMS in national as well as international environment. A specific requirement is the capability to interoperate in a multinational force.

The example of the German Army shows, while in a first step the Battlefield Management System was designed to solve the major problem of transferring relevant information from the battalion level to higher levels and across all arms and services, the current *FüWES Kern Heer* project serves to tackle, apart from the interface problem, the other problem of uniformity particularly in the areas of communication links, controls and basic functions.

Both projects jointly form the basis for a German digitized battlespace. As said before, the top-down approach is the right way. Users will receive systems which are operated in an identical or similar way, the systems will have a high level of interoperability, sufficient time will be set aside for the innovation process, and the costs will be reduced.

However, such a course of action requires configuration management investments, and it does not imply that all components will be realized at the same time! This aspect is taken into account through an incremental bottom-up realization of individual projects as part of an overall draft program. Such a draft program provides guidelines, defines subsystems and subgoals, enhances the communication between those concerned and ensures that nobody deviates from the specified course of action. The individual projects take account of the division of responsibilities among the arms and services of the Army, their special capabilities, their specific information requirements as well as the availability of technical and economic solutions. Only projects therefore enable us to detail a part of the general system design to such an extent that dates can be fixed for its beginning and end, funding levels can be determined and allocated. The goal is to place heterogeneous components and subsystems under the roof of a homogeneous system design and between the pillars of uniform gateways and interfaces. Information technology should by all means apply the principles of engineering construction. We should beware of simple solutions such as the extensive use of common off-the-shelf software (COTS), of the "the same for everyone" mentality, which is much too simple. We will always have to be prepared to make expensive adjustments to meet concrete requirements. And the adaptation of military needs to COTS-based information systems very often means extensive work as proprietary development.

"New Army for New Tasks"

The integrated reconnaissance, command and control, and fires system as well as the system of interactions within the post-modern, the so called "New Army for New Tasks" are driven by the following key factors: Extended mission spectrum, multinationality, joint operations, meshing of a force

comprising the elements of Main Defense Forces, Reaction Forces, Airmobile Forces Command and Special Forces Command.

Interoperability, mobility and tempo
have become the key success factors for military operations.

According to all today official political statements the participation in crisis management activities and above all in peace missions is the most likely operational option of the modern Army. Even if the expression is not being liked very much in this context, it is *intervention* what the post-modern army's mission is going to be. The current operations in former Yugoslavia and East-Timor or Sierra-Leone demonstrate this very clearly. Operation "Libelle" in Tirana and the shot down of an US.bomber during the war on Kosovo as well as the actions in Kongo ans Sierra-Leone also demonstrated that rescue and evacuation missions of different kind and size are real operational options of the Army. Now, which aspects are relevant for digitization?

Intervention in the form of peace missions and evacuation operations clearly show that in this context the term "battlefield" has become inappropriate, as the "area of operations" of the Army actually goes far beyond traditional battlefield limits. The type, scope and sequence of operations can no longer be expressed exclusively with terms derived from the combined arms combat. In this context, the following aspects seem to be significant for the planning and use of information technology:

- Combat actions are not always the central element of military operations; police-type tasks are becoming a distinct possibility (as we can observe in todays missions).
- The geographically uniform battlefield is replaced by several wide-ranging areas of operations, which implies the possibility of simultaneous operations of different types in different areas.
- Combat service support and combat support arms and services have gained a new and dominant importance.
- The customary organizational structures of units are replaced by changing short-notice task organizations of small mobile units which are mixed and multinational down to small-unit level.
- The chains of command are set up flexibly and as the situation demands.

From this, we can draw the following practical conclusions among others: Operations as part of UN missions require new standards of behavior as well as new skills and capabilities of all elements of a unit down to the squad and individual soldier level. Prevention of violence, assistance and support but also maintenance of law and order are tasks which put the limelight on the individual soldier as a representative of the armed forces and thus challenge him to a greater extent than in the past. Leaders are no longer capable of exerting influence and leadership at any time and any place. This type of situation requires the employment of electronic systems which will provide the individual soldier with the overall situation picture guiding everybody's actions! The current overall and relevant situation picture as the central element of command and control support has to be made available even to the smallest unit and to the individual soldier by means of an efficient and mobile command and control asset. The German *UN command and control support DP system* employed in Bosnia by GECONSFOR is a first satisfactory technical solution which meets this requirement.

Generally speaking, the extended mission spectrum implies that the equipment provided for combat has to be supplemented and that analyses of military requirements which form the basis of IT projects have to take account of the new operational options and missions resulting from peace support operations.

The possibility of several wide-ranging areas of operations immediately brings to mind the need for satellite communication, but I would like to address other, less discussed factors. The requirement for long-range command and control is due to the fact that operations are commanded and controlled from the homecountry in close cooperation with the political leaders. The classical separation of political and military leadership and the clear separation of the military command echelons is superseded by the wide network of the command and control organization, which encompasses all command echelons. The integrated command and control system includes the government as the

highest level and the small unit as the lowest level. The direct contact between the military and political leaders shows that today operations unfold under the eyes of a public living in a peacetime environment. The reliance on satellites belonging to other states, which are also used for general commercial purposes, indicates on the other hand that military operations and information are embedded in a largely peaceful civilian setting. Technically speaking this also means to be tied into the complexity of worldwide digital networks which were set up to serve totally different interests. The reliance on these commercial media, or commercial lines and networks, is unavoidable. Therefore, digitization efforts require the application of the standards used there, require the use of commercial off-the-shelf software (COTS). This applies to interfaces, network and transmission protocols.

The drawback of the use of commercial networks is the increasing hazard to military or more precisely militarily used information. Public networks are intended to ensure free access to information and a simple and extensive linkage of subscribers. But the easy access to a commercial network equally increases the vulnerability of connected CCIS. The difficult problem of data security and data protection while preserving the maximum freedom of communications requires already today a balanced answer during the prelude to **Information Warfare**. Economic interests of the press, diverse political intentions, playful computer hacking as well as hostile intentions may all be reasons for unauthorized entry into information systems in order to read, block, or manipulate the information available there. The vulnerability of modern CCIS systems from the vulnerability of their constituent components or subsystems and is aggravated through highly interoperable networks. Terms such as jamming, deception, destruction or denial measures will have to be redefined for the digitized area of operations. Information warfare will affect all elements of an information system, man and machine, and has a technical as well as sociological and psychological character. This aspect clearly indicates that the signal troops will gain in importance in the future. Especially the electronic warfare signal forces will be regarded as a combat arm in the future because of their defensive and offensive capabilities and their capability to exert influence on enemy command and control centers, at a time when electronic warfare will become a main combat focus in the struggle for information dominance. In this context, the psychological operations forces will also play an important part.

Also the significance of all those troops will increase, which can be employed in support of humanitarian and reconstruction assistance, such as medical service, engineers, logistics and transportation troops. Traffic management is also likely to gain in significance in the extended spectrum of operations. The further development of the above-mentioned arms and services and their command and control and weapon direction systems will have to focus on translating their expert knowledge into C^2 relevant information, on their contribution to the overall information picture guiding everybody's actions.

The typical constraints of future operations, i.e. widely varying organizational structures, diverse scenarios and short-notice operations, require efficient command and control support not only during the actual operation but already during the planning, organizational set-up and equipment assembly phases. The realization of an integrated command and control system requires an overarching theoretical information management concept and manifests itself in the integrated system of command and control means as part of the command and control organization selected for a specific mission as required by the current situation.

If the independent actions of the major Army units, which are integrated into international and multinational structures, are to be brought into line with the actions of the other Services and of other nations, and if the Army is to meet the great variety of crisis management requirements on a short-term basis, the command and control system of the Army, as a constant factor among these variables, has to be established on the basis of a digital integrated system of command and control means. Since the process of digitization will progress in the Army's area of responsibility, its controlled participation will be inevitable.

F.D.