

GEOGRAPHIC SUPPORT DURING OPERATIONS

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Abstract

One of the main missions of the Spanish Army Geographic Centre is to provide the required geographic support for planning, conduction and execution of military operations carried out by the Spanish Army.

Because of the new conception for the Spanish Armed Forces, and its marked deployable character, the needs of geographic support have undergone a radical change. These requirements use the new technologies for information and communications systems, not only for the traditional hardcopies but also for the new digital formats.

Although this geographic support has been given, in a very efficient way, by the Army Geographic Centre, in barracks, it is clear the necessity of making more dynamic such support, in order to give it on the field, integrated into the supported Units.

The aim of this presentation is to show the new concept for the Geographic Support to Deployed Units within the Army, and the Geographic Support Unit.

INTRODUCTION

For ages, the knowledge of the physic effects of the terrain have role a predominant item in the development of the societies, both in war and in peacetime.

Terrain is a part of the Earth surface that includes both natural and man-made features. Terrain analysis is the process of analysing and understanding this features and the weather influence on them. Information is raw data, relating to a piece of terrain. The knowledge of the battlefield is extremely important in all phases of operations, and in every planning echelon.

The present Spanish Army focuses its activity, as one of the main priorities, to the participation in international missions. For an Army that intends to have a marked deployable character, geographic support is essential, especially in zones where the knowledge of the geography can only be obtained based on imagery. In others words, if the intention is that the Army can success those missions it is involved in, particularly if the Army should lead that missions, it is basic to provide it with the organization and means that guarantee an effective geographic support during operations.

Geographic support is essential for planning and conducting operations, whatever type of mission could be. The modern systems of information to be introduced by the Army have more need of digital geographic information, but formations still require paper hardcopy maps, even not very accurate. When geographic support to Units is provided in theatre, it increases the effectiveness and opportunity of it.

Organization, filling and management of digital geographic information databases, require specialized manning and techniques, that it should not be entrusted to unskilled personnel. In the same way, map-making on the field requires certain skills that they are not common knowledge.

All this remarks emphasize that deployed formations should have special elements, organic dependent or not, with special organization, with special organization, equipment and training, to carry out all the military requirements regarding to the geographic support during operations.

AIM

This paper shows the organization, mission and tasks of the Geographic Support Unit (GSU), according with the Concept of Geographic Support in Operations, in the Spanish Army. The GSU, without dedicated personnel in peacetime, is made up on the base of the Army Geographic Centre, for training and operations. It depends, organic and functional, on the Army Geographic Centre, and is able to deploy and carry out the geographic support during operations, in accordance with the premises in the Concept document.

FIELD DEPLOYABLE GEOGRAPHIC SUPPORT

An efficient geographic support must fulfil the following operative requirements:

- To provide geographic support in all related to command and control.
- To manage and provide the required geospatial data.
- To make or adequately support the Intelligence Preparation of the Battlefield (IPB).
- To provide standardised geographic products.
- To provide mission-oriented geographic products. Establishment / densification of geodetic/topographic networks, using geodetic techniques. Training for personnel.

In order to carry out these requirements, it is necessary to deploy, in the Theatre of Operations, geographic support elements with the necessary resources to carry out the work. Therefore, the capabilities deployed will vary, but will include some or all of the following ones:

1. **Provision of geographic advice to commanders.** Commanders must have the adequate geographic advice, given by the specialist geographic personnel, in order to ensure the best use of data, products and capabilities.
2. **Acquisition and production of geographic data.** Geographic elements will be able to acquire and exploit imagery or any additional source of information when deployed, which can increase or update the existing databases. These sources can include satellite imagery, aerial photographs, local datasets or geodetic positioning.
3. **Management of geographic data.** Geographic elements should be able of managing digital geographic data, which have to be organized in databases that allow the exploitation of the information.
4. **Terrain analysis.** Terrain Analysis is the process of collecting, analysing and evaluating geographic information on the natural and man-made features of the terrain, its interpretation in combination with other relevant factors, to provide predictive information and advice about the effect of the terrain on military operations, abbreviated as TERA. The aim of the process is to provide the essential inputs for the Intelligence Preparation of the Battlefield (IPB). Intelligence Units are responsible of IPB process, but normally, they will need expertise reinforcement from the central geographic element, the Spanish Army Geographic Centre.
5. **Geographic Information Presentation and Production.** Geographic elements are responsible for the composition and presentation of the geographic information, in the most suitable way, to HQs and subordinated Units. Apart from this, they have to prepare the geographic information to be reproduced, both digital and paper.
6. **Generation / Densification of geodetic / topographic network.** Identification, checking and homogenisation, if exist, of the geodetic / topographic network-s in the area, and the establishment, construction and calculation, if not.
7. **Geographic information distribution / Dissemination.** All the formations in the Area of Operations must receive the appropriate geographic products. The system to distribute or disseminate the information needs to be enlarged with one geographic representative in its structure.
8. **Geographic personnel training.** To ensure the smooth running of the geographic support in operations, is essential the best training of the specialized personnel. The Spanish Army Geographic Centre is the responsible for the training in geographic matters.

The mechanisms to provide the essential capabilities in this area are described through the Operative Concept for Geographic Support during Operations:

- Operative Planning, to determine the entity of the needed geographic support to satisfy the operative requirements.
- Operative Concept for organic elements and the required reinforcements.
- Operative Concept for the Geographic Support Unit, dependent on the Army Geographic Centre.
- Operative Concept to ensure the sustainment of the deployed geographic elements.

GEOGRAPHIC SUPPORT UNIT

The mission of the GSU is to provide the required geographic support for any type of operation, to support the deployed forces in operations, and, if necessary, to reinforce the organic geographic elements in the HQ, if exist. Deployed geographic support means to provide, in the right time, accurate information about battlefield and the terrain to all operational commands in the different echelons during operations. This responsibility includes the ability of collecting and acquiring geographic information, database management and its fulfilling, and the production and dissemination of this information, and to provide support and training to specialist personnel in the Units.

The GSU has a modular structure, that allows to suit the size and composition to the mission, the entity of the Unit to be supported, the legal restrictions to the deploy, or any other circumstances that could affect.

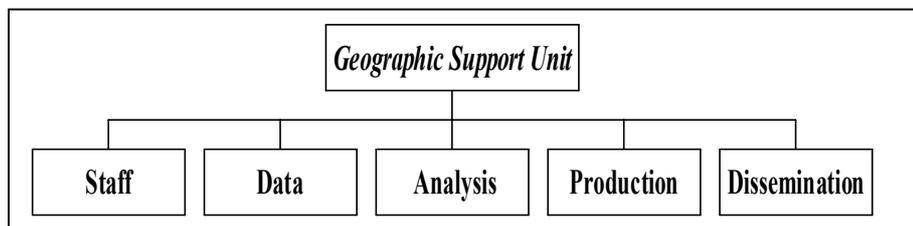


Fig.1. Geographic Support Unit structure

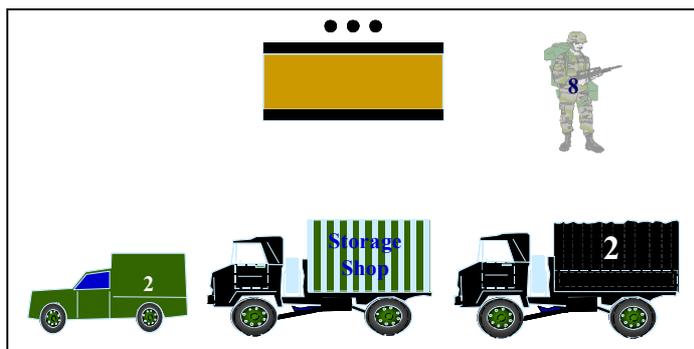


Fig.2 GSU. Command and Staff structure

- **Command and staff.** It is the direction, management and advice element. It includes specialists in electricity, computing and communication systems. Normally, it will deploy near the highest level of command.

- **Data.** The mission of this element is the acquisition and collection of information in the field, and everything related to topographic and geodetic surveying. Moreover, it is in charged of checking and updating the existing geographic information, which usually will be outdated and without known accuracy.

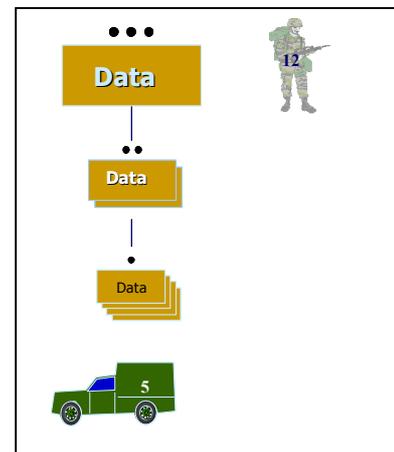


Fig.3 GSU. Data structure

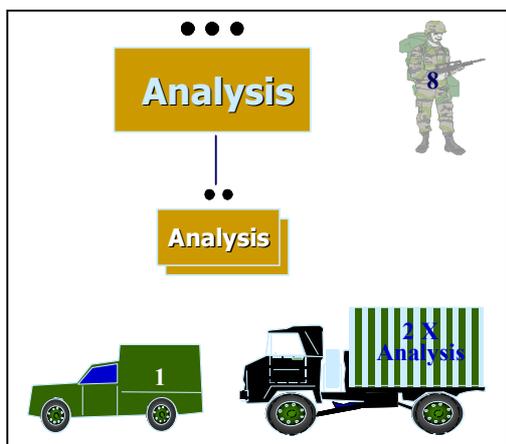


Fig.4 GSU. Analysis structure

Analysis. To develop everything regarding terrain analysis, with a limited printing capability. It will create the products required by the final users, and is responsible of the maintenance, fulfilling and exploitation of the geographic database, once the unit is deployed.

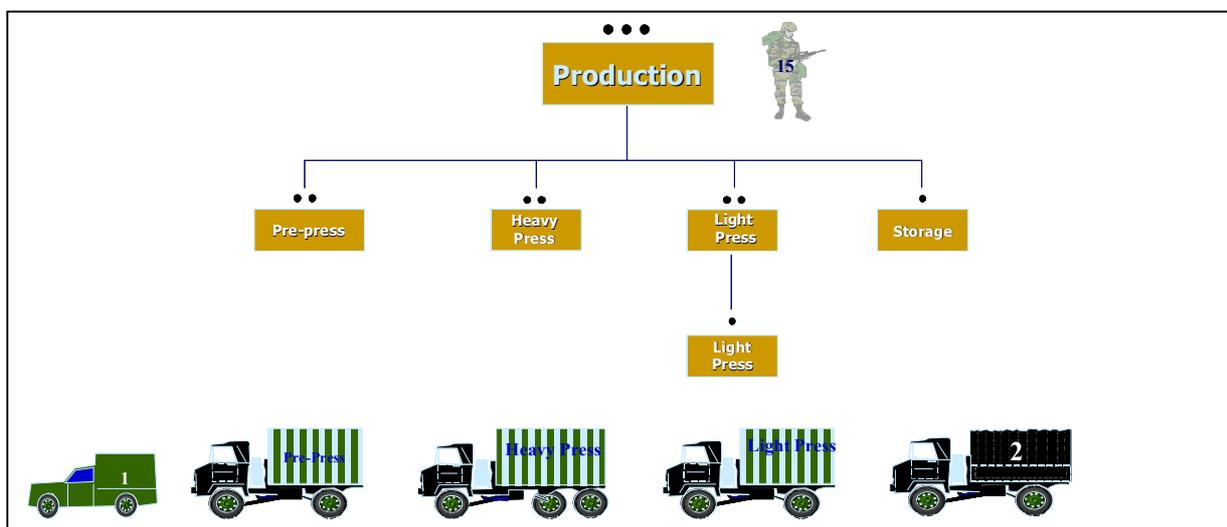


Fig.5 GSU. Production structure

Production. The main mission is to reproduce the hardcopies. This is possible in the two aspects of the geographic support: on the one hand, providing support to the HQ, with special products to generate and in quite large format and small number of copies; on the other hand, providing products to subordinate units, in a smaller format, and more standardised products, and in bulk production.

- **Dissemination.** For the distribution and dissemination to the final user of all the products generated.

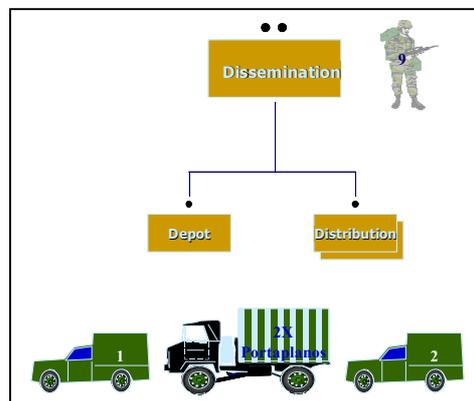


Fig.6 GSU. Dissemination structure

GSU is based on normalized size shelters, which are airborne, NBC protected and self-powered with generators. It is composed of 7 NATO 2 size, and 1 20 feet container both sides expandable. Its structure is modular, which means that not all the elements have to be activated. The activation time for the GSU has to be similar to those units that are going to support.

After the mission is given, the process to constitute the GSU is started. The first step in the planning process is the analysis of the mission and to foresee of an initial estimation of the size and composition of the unit. In this phase, the command of the Unit should:

- Analyse the mission of the higher formation command.
- Analyse the concept of the operation.
- Identify all the forces that will be deployed.
- Identify the guidelines of the MoD or General Staff.
- Identify restrictions and periods of time.

After this study, it is necessary to develop a Geographic Support Plan, which includes:

- Collecting and acquisition of information
- Fulfilling the geo database
- Terrain analysis
- Reproduction of the existing information
- Geographic Information Presentation
- Personnel specific training
- Define the command relationships between GSU command and the formation command
- Required reinforcements
- Rotations
- Signal communications with national agencies
- Acquisition of material
- Transportation
- Weapons
- Personnel life conditions (leaves, payments, rewards, ...)
- ...

Once deployed, it is when the real geographic support starts. For the data elements, the first mission to carry out is to check the geodetic network, if exists, and complete it, if necessary. It would be also necessary to do any survey, accurate location of elements, including attributes or toponymy, obtaining ground control points, support to Engineers, updating of communications...

For the analysis element, the normal job will include general terrain studies, perspectives from any direction, ortophotomaps generation, imagery exploitation, cross country mobility, visibility, products to help the IPB process, specific thematic maps (such as roads, CIMIC, mine fields, ethnic distribution, Startex maps...), normalized maps, urban maps, terrain analysis based on multiple criteria, fly-through generation, DTM generation, cross river studies... In all this tasks, it will be essential to keep the interoperability with the allied nations that could participate in the same area or mission, in order to make best use of the information.

For the production element, the mission is to reproduce geographic information in order to provide the HQ Staff and the subordinate units with the required products to carry out their respective missions. The needs of the HQ are quite different from those of the subordinate units, not only in the size of the products, but in the amount of copies, their nature, and the aim of such products.

The dissemination element is the responsible to deliver the final product to the final user, or to the logistic element, where the products will be picked or distributed by/to units.

CONCLUSIONS

The present Spanish Army has a marked deployable character, and it has been proven that “in situ” geographic support is essential for planning and conducting operation, and for the success of the whole mission.

In other words, if the aim is that the Army could success those international missions in which is involved, and even more if we try to lead them, it is basic to provide it with a organization and means that guarantee an efficient geographic support during those operations.

Starting from this premise, Spanish Army has developed a Operative Concept for Geographic Support during Operations, that includes the creation, in 2002, of an specific unit, the Geographic Support Unit, based on the Army Geographic Centre, where manning and means belong. This issue guarantees the availability of the Unit in time, skills and data.

GSU, with its modular structure, could fulfil the land units operative requirements in, virtually, all the predictable scenarios, since leading a LCC or COMANFOR until the worst case, which is two different scenarios with two brigades involved.

It is necessary to assume, in case of activation of the GSU, the decrease of the production capabilities of the Army Geographic Centre, in all related to geographic information of the national territory.

With this Unit and its capabilities, the Spanish Army is able to fit the geographic support during operations, not only for national formations but even participating in international missions, which Spain intends to lead.

AUTHOR'S BIOGRAPHY

Born in Madrid in 1966, is promoted to Artillery Lieutenant in 1989. He did Geodesy studies from 1991 to 1994, in the Army Geodesy School, and once finished, is assigned to the Army Geographic Centre.

In 1995, the author participates in the elaboration of the urban cartography of the city of Mostar (Bosnia and Herzegovina), in a EU project.

In 1996, as member of the Spanish Antarctic Campaign, takes part in the surveying of Livingstone Island, in the South Shetland Islands.

In the period between 1998 and 2000, he takes several specific military courses, in order to be promoted to Major in 2001.

In 2001 is designated NATO Geodatabase Manager, in SHAPE (Supreme Headquarter for Allied Powers in Europe), in Mons, Belgium, for a six-months period.

In 2002 is designated as Chief of Geographic Support Unit, in the Army Geographic Centre, taking part in several exercises with the NRDC-SP HQ (NATO Rapid Deployable Corps).

He also has attended several international geographic meetings, such as DGIWG (Digital Geographic Information Working Group), IGEO (NATO Standardisation agency), UE Geospatial Conference, NATO Geographic Conference, Eurocorps Geospatial Concept Conference...

Nowadays, he is still Chief of Geographic Support Unit, and commands the Imagery Section in the Army Geographic Centre.