

Editorial

Whatever military action is planned, performed or analyzed, it takes place in geo-graphic space. Therefore, information about this space - the *geospace* - is essential for every military decision-maker. This particularly applies for the new fields of military geographic activities - the provision of (geo-) data for all kinds of C3I systems as well as for worldwide operations. The quality and quantity of geographic information required have increased dramatically since the end of the Cold War, and military geography has to face new challenges.

Moreover, despite ongoing reorganisations and other often quantity-reducing transformations of the armed forces, military geographic information will remain essential for *every* military action. Therefore, the editors collected arguments to further guarantee all appropriate capacities in a changing military and security environment.

The *International Handbook Military Geography* (IHMG) was designed to present such arguments - primarily by showing the wide field of activities covered by military geography. On occasion of the NATO&PfP Geographic Conference in 2004, we encouraged nations to cooperate in defining military geography by the entirety of relevant papers presented. Several major topics are missing and some other topics are more than adequately represented. Being aware of this, we like to invite the military geographic community to intensify cooperation when a second edition will be prepared - to get a more balanced thematic structure of articles.

The IHMG thus may be seen as a shop-window of military geography. As there was no stringent coordination *between* the papers presented, some thematic overlappings have been unavoidable. But just this may show the need for a closer coordination in future.

To sum up, what is the aim, what is the purpose of the IHMG?

The *aim* of the IHMG is to present *selected activities* and *products* of the military geographic community as well as *important and relevant activities* and *products* of institutions outside of this community.

The *purpose* of the IHMG is to show the plurality of *activities* and *products* to the community itself, to the armed forces in general, but also to a wider public for better understanding of what military geography deals with and what it can provide.

By this, the IHMG is at the same time a means of *information* as well as a means of *education* and *training*, and as such, a first approach to a future *military geographic encyclopedia*.

Moreover, the IHMG shall support and flank the great efforts made since 1994 within NATO's *Partnership for Peace Program* to standardise and homogenize all military geography-related activities and products.

The IHMG consists of 52 papers by authors of 7 different European countries. Its articles are divided into three thematic blocks, namely

- *Basics and Tools*,
- *Tasks and Applications*, and
- *Perspectives and Horizons*.

Within these blocks, a logical order of articles was aimed at.

A fast and effective information access within the articles is guaranteed by a stringent order of standardized formal elements:

- Author, Title,
- Keywords,
- Abstract,
- Conclusion,
- Glossary,
- Bibliography,
- Internet References,
- Biography of the author.

By this and - in one - by limitation of extent as well as by a clear and simple language, it was tried to make an easy access to the reader. The challenge for all authors was to communicate the essentials.

The register in the annex points at the *keywords in the glossary*. There is no reference to expressions or terms within the articles themselves.

Before giving a short overview of the content, the editors wish to express some acknowledgements to persons and institutions involved in planning and producing the IHMG:

To begin with, we would like to thank Brigadier W. HABECK heading the department *Training Division B* of the *Joint Command and Control Staff* within the Austrian Federal Ministry of Defence for accepting, releasing and furthermore supporting the project.

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Brigadier Mag. H. WALTHER heading the Language Institute of the Austrian National Defence Academy and his staff tried very hard to eliminate linguistic and stylistic lapses of the papers from authors with non English mother tongues.

Colonel Mag. G. GNASER from the *Institut für Militärisches Geowesen* (Institute for Military Geography) of the Austrian Armed Forces checked every text carefully emphasizing especially terminological aspects of the English language.

Last not least the editors wish to thank the chairman and all members of the NATO&PFP Geospatial Conference as well as the international and national authors for their willingness to participate in this project - they have thus made themselves the spearhead of self-image of military geography worldwide!

In the following, we would like to give the reader a short guideline throughout the IHMG and its articles.

1st Thematic Block: Basics and Tools

The classic approach of Military Geography comprises features of landscapes, analogue and digital maps, their update by orthophotos and/or remote sensing data, and various cartographic topics. To start with, for the very first time a theoretic background on how Military Geography can be defined is given.

As the saying goes, nothing is more useful than a good theory, Reinhard MANG and Hermann HÄUSLER (Austria) try to set up a theory of Military Geography based on the overall useful term of a *milgeomodel*.

The team Tamino EDER, Maximilian FRAUSCHER and Gerald GNASER (Austria) gives an overview on *research and development* performed by Austrian Military Geography.

Although the Earth is available on disks, Vasile CHIRIAC (Moldavia) introduces the real *shape of the Earth* and the *reference systems* used.

Dušan PETROVIČ (Slovenia) writes on *cartographic production processes*, the methods and technologies that are nowadays used for production and reproduction of different kinds of maps and other cartographic products.

Robert DITZ (Austria) presents *topographic cartography for navigation purposes* in the field and as a means of information serving for planning and realisation of military activities in the middle and upper command level.

Gerhard STÖHR (Austria) highlights the use of the *digital terrain model* for military use. Among others, it is the basis for the best locations of transmitting stations for telecommunication as well as for flight simulation and virtual three-dimensional models of the earth's surface.

Ivana WECHSELBERGER (Austria) describes the potential of *high resolution satellite images for updating of topographic maps*.

Wolfgang WECHSELBERGER reviews and analyses *available satellite platforms for the acquisition of geodata*.

Stanislav BABNIĚ (Slovakia) introduces the 1 : 250 000 standard map series within NATO and the PfP-participating countries, termed *Joint Operations Graphic* (JOG). In his second paper he describes the *Vector Map* (VMap) concept, the digital geospatial information in the scale levels 1 : 1 000 000 (level 0), 1 : 250 000 (level 1), 1 : 50 000 (level 2) and in large scales for the use in Geographic Information Systems (GIS).

As digital and analogue maps and in particular internet-based maps are often copied and reproduced regardless of existing legislations, Christoph TWAROCH (Austria) informs about *basic international copyright regulations* to be followed.

Ivana WECHSELBERGER (Austria) gives an introduction to *digital image processing*.

Michael FRANZEN (Austria) explains how to *distort aerial photos using the digital elevation model* and the use of the resulting digital orthophotos for simulation systems (virtual reality) and for visualisation.

Hermann HÄUSLER (Austria) introduces *military geology*, which is an applied geoscience, providing information on soil and subsoil conditions for the best use of terrain for military actions.

Johannes REISINGER (Austria) gives a critical evaluation of the sometimes confusing media reports on *earthquakes* as well as recommendations for general improvements of earthquake disaster awareness and preparedness.

The paper of Tamino EDER (Austria) deals with *ecology of military training areas* demonstrating how armed forces can cope with the environmental protection and nature conservation on their training areas, as future regulations for exercises will become steadily stronger.

Gerald SCHLAGER (Austria) stresses the *long term planning in forestry* and concludes with its use for tactical and strategic military planning.

Georg BISSINGER (Austria) introduces basic *military aspects of climatology* relevant for military geographic needs.

In his paper on English language teaching, Gerald GNASER (Austria) shows how to *exercise terrain orientation in a lecture hall* instead of the open country.

Werner HERISZT (Austria) presents the basic *functions of approximation and precise orientation in the terrain* with and without technical equipment.

Alan STROMBERG (United Kingdom) introduces *satellite based navigation*, which has revolutionised navigation, positioning, guidance and logistical tracking.

2nd Thematic Block: Tasks and Applications

Application of data from various geosciences for military purposes and their use in missions abroad is dealt with in block two of IHMG. Comprising military aspects of neighbouring geosciences, Military Geography is seen in a wider sense.

Horst PLEINER (Austria) highlights by a wide and impressive general *military historic review* that Military Geographic factors have always been - and will remain - key elements in operational planning.

Hermann HÄUSLER (Austria) reports that *historic military maps* show different methods of terrain evaluation of the battlefield and different thematic maps for military commands. He recalls the so-termed *combined method* based on the expert-knowledge of military geoscientists, such as applied geographers, geologists, meteorologists, hydrologists, soil scientists, vegetation scientists and others.

Operations abroad may bring soldiers in strange situations with different climates, other sea level zones, or exotic nourishment. Peter AUMÜLLER (Austria) reflects on some *geographical key factors for operations worldwide* and the lessons learned by neglecting some of them.

Thomas PALASCHEWSKI (Germany) analyzes in two papers the *impact of geographical factors on the security of national and supranational organisations* including special aspects of maritime geography. Emphasis is laid on Germany on the one hand and NATO on the other hand.

In his article on cartographic 3-D models Markus JOBST (Austria) explains that digital *3D representations of modelled objects and landscapes* offer high precision details of their content for local military applications, but create difficulties in distribution, perception and knowledge transfer.

In his paper on applied cartography Werner HERISZT (Austria) describes how the content of a map is exploited by means of *geographic and geometric map analyses* and their respective working methods.

John TATE (United Kingdom) states that *terrain analysis for decision making* has traditionally been the reserve of high intensity conflicts, but the changing focus of military operations, coupled with increased data availability and analysis capability made terrain analysis useful for the needs of the Military Commander across all levels of command and throughout the whole spectrum of military operations.

Mark R. H. BURROWS (United Kingdom) clearly states that every *military action needs geospatial information*, which is in particular true for multinational operations in remote theatres of action.

Rudolf WASTL (Austria) is experienced in *geospatial planning for military purposes* and explains how - on the one hand - planners can evaluate and promote military requirements towards civil planning authorities, and how - on the other hand - they can advise the military when external environmental and spatial planning necessities are to be incorporated.

Although his experiences date back to the Cold War in Europe, Hubert FLACHBERGER (Austria) nevertheless states that despite the changes in the concepts of defence, *aspects of terrain reinforcement* and the military geographic background involved are still valid and important.

Dealing with Remote Sensing for military applications, Diethard LEBER (Austria) reports that *satellite based Earth images* are playing a major role for supporting military missions during a pre-conflict phase, for combat intelligence and for monitoring operations in a post-conflict phase. Different types of sensors, their spatial resolution, and their military geographic use are discussed.

Maximilian FRAUSCHER (Austria) writes on *military regional fact sheets*. Varied and comprehensive geographical information about the area of operation is an important component for operation planning, preparation and enforcement for troops as well as for commands.

In his paper on *Military Geographic classification of areas*, Reinhard MANG (Austria) shows how to define, designate and systematise such areas especially for military purposes, primarily in order to guarantee a standardized use of geographic area terms.

Jove TALEVSKI (Former Yugoslavian Republic of Macedonia; FYROM) writes on *borderline fact sheets*. At first sight, the simple terms for borderlines and state borders can often create serious misunderstandings because these terms are interpreted in different ways by different sides.

Werner LEITHNER (Austria) gives examples for the need and use of *maps for recent search and rescue* (SAR) missions such as the 2003 earthquake in Algeria, the 2003 earthquake in Iran, the 2004 EUDREX SAR exercise in Austria, and the 2004 tsunami flood catastrophe in Sri Lanka.

The paper of Georg GARTNER and Markus JOBST (Austria) deals with the context of *cartography and the Internet* and briefly discusses the technological background of the Internet and especially the World Wide Web, which is an ever increasing means of geoinformation acquisition.

Friedrich TEICHMANN (Austria) writes on *geodata for military aviation*. Key elements of geospatial data for use in military aviation are aeronautical charts at a 1 : 500 000 scale such as the Operational Navigational Chart (ONC), the Tactical Piloting Chart (TPC) and the Visual Flight Rules (VFR) charts.

Gottfried TICHY (Austria) presents a paper dealing with the *military use of caves and caverns*, stating that a comprehensive registration of caves and artificial cavities, as well as underground constructions and subsequently a careful evaluation of the suitable objects during peacetime are required.

The paper of Josef-Michael SCHRAMM (Austria) on tasks and *challenges of Military Geology* is related to engineering geology, highlighting and underlining by historic examples that physical properties and the structure of soft and hard rocks directly control engineering aspects of armed forces.

The paper of Dierk WILLIG (Germany) on *contaminations of military sites and training areas* deals with the identification, examination and remediation of suspected contaminated sites (SCS) and with recorded contamination sites (CMS) on military premises in Germany. In a second paper he reports on *geology and water supply on international military missions*. The provision of an autarkic water supply, which is mostly independent of external influences and sufficient in terms of both quantity and quality, is an essential pre-requisite for the successful conduct of military operations.

Gottfried TICHY (Austria) refers to the *protection of cultural property*, which is an obligatory specification in Civil-Military Cooperation (CIMIC). The incorporation of Cultural Protection Officers (CPOs) should be compulsory during international military operations in planning, exploration and reconnaissance of deployment areas, moving into deployment areas and for the whole duration of the military operation.

3rd Thematic Block: Perspectives and Horizons

Papers attached to this block deal with new developments in geospatial sciences and with methods that will have to prove their usefulness in the future.

In his article on international boundary concepts Neal ARCHER (United Kingdom) provides the *basic generic concepts of international boundaries* to enable the reader to generate own boundary studies, and to provide advice in support of operations.

To evaluate the *advantage of maps compared to aerial photos*, Rudolf WASTL (Austria) reports on experimental research with more and less experienced soldiers and gives advice for military training, education and missions.

Robert DITZ (Austria) works on *future maps of artificial realities*. Such maps are necessary for map exercises if the real terrain does not offer the assumed training scenarios, or simply for political reasons.

The paper of Georg GARTNER (Austria) deals with the development of *Location Based Services* and maps as well as *TeleCartography*. TeleCartography opens the gate for the distribution of cartographic presentation forms via wireless data transfer interfaces and mobile devices.

Hermann KAUFMANN and Sigrid ROESSNER (Germany) describe the use of *hyperspectral remote sensing* characterising surface materials of the Earth by up to several hundreds of spectral bands. This enables the identification of man-made structures in urban environments and the quantification of soil parameters characterizing military manoeuvre impacts, and thus will be an important means for military geographic computer assisted remote sensing data interpretation.

Wolfgang STROHMAIER (Austria) presents a *curriculum of Military Geographic education and training*. He shows that subject matters, materials and devices, as well as the education itself have changed or are going to be changed according new tasks.

Leopold WEBER (Austria) states that careful *monitoring of mining production and economic growth of countries worldwide* is useful to assess the trend of import-dependency of strategic mineral products. Military Geography should be able to provide such information for strategic levels of decision-making.

Richard SAMPSON (United Kingdom) contributes the very last article of this Handbook, compiling the *Uniform Resource Locators (URLs)* of all authors in a paper on Internet addresses.

As can be seen, the *contributions in this Handbook* sometimes exceed the classic scope of Military Geography. Thus, we face a fascinating new Military Geography in a wider, much more comprehensive sense - encompassing an ever increasing number of applied geosciences united by the common intention to create models of the geographic reality for military purposes.

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