

RECOMMENDATIONS REGARDING THE UTILIZATION OF TERMINOLOGY AND NOTATION IN PHOTOGRAMMETRY AND REMOTE SENSING EDUCATION

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Commission VI, WG VI/1

KEY WORDS: Joint-education, Aerial Photogrammetry, Absolute Orientation, Cadastre, Teaching, Professional, Theory

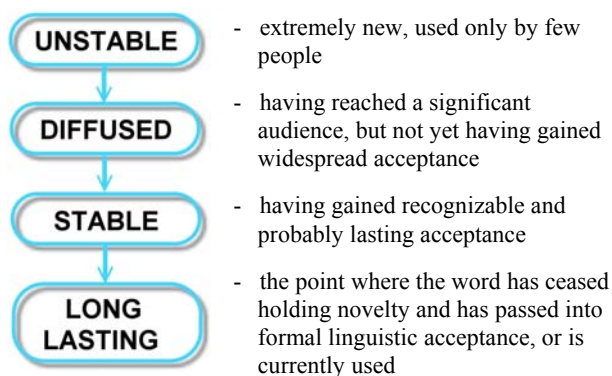
ABSTRACT:

The problems regarding the terminology and the corresponding notation, apparently unimportant, continue to be the subject of some passionate discussions among the specialists in photogrammetry and remote sensing field, because the terminology and notations have an important role in the formation of future specialists and in communicating among them and they should be thoroughly acquired even since university and post university studies. Having in view our university experience, in this paper some recommendations regarding the utilization manner of the terminology and notation in photogrammetry and remote sensing learning are presented. Two aspects are enlarged upon, namely: the notations and especially the terminology must correspond with the specific features of the language of each country; mention should be made of those used in the international language as well especially in the English language. Therefore, we recommend that terminology and notation should be presented to students in both national and international variants.

1. INTRODUCTION

No new domain is possible without neologisms, new words or new interpretations of old words. To reject neologisms is to reject scientific development. Progress, the ever larger diversity and the complexity of the technologies resulting in the technical innovation lead to a lexical innovation in the sense that new domain, a new subject, a new technology, together with the corresponding terminology appear (Busuioc, 2006). Consequently, the Romanian higher education had to adopt itself to this necessity (Turdeanu, Noaje, 2004).

Referring to their evolution, neologisms tend to pass through the following stages (Wikipedia, 2007).



Some of the most common ways through which Romanian “imports” foreign words are (Herteg, 2006):

- literal translation, graphical and phonetical modification with the same conceptual identity (for example, processing – prelucrare);
- the foreign term is adopted without being modified graphically or phonetically (for example, hardware);

- words which came into being by an extension of meaning (for example, to apply – a aplica, which extend the Romanian meaning from practical application to apply for a position);
- foreign words which are used in every day speech, although there is an equivalent in Romanian (for example, training – instruire, or high tech – tehnologie de vârf);
- as regards borrowing abbreviations, they have different treatments: some are taken over in their original form (for example, GPS – Global Positioning System) and others are translated into Romanian (for example, GIS – Geographic Information System → SIG – Sistem Informational Geografic).

The ISO Committee for terminology propose a series of recommendations, in one of the basic standards (Busuioc, 2006):

- the **terms** created in the **national language** are preferred to those borrowed from another language;
- a term must be **transparent** (clear), i.e. the concept it defines could be deduced, at last partially, without definition;
- the new terms must integrate into a terminological coherent system, taking over a certain **formal model**;
- the proposed term must **adequate**, i.e. to adhere to a structure of significations specific to the respective linguistic community, to avoid any possible confusion;
- a term must be as **concise** as possible, especially in oral communication;
- the productive forms, that allow forming some **derivative** paradigms have priority;
- the neologisms must be created in accordance with the morphological, syntactical and phonetical rules of the respective language, i.e. to respect **linguistic correctness**.

2. SOME ASPECTS REGARDING THE TERMINOLOGY IN PHOTOGRAMMETRY AND REMOTE SENSING

The newly introduced terms, especially those belonging to a specialized vocabulary, cannot be left aside as they reflect the novelties which have occurred in those domains. Specialized languages are the greatest suppliers of neologisms in a language, a branch of applied linguistics-terminology- emerged in order to prevent the wrong and ambiguous assimilation, to give coherence and adjust these terms in accordance with the organic rules governing the language.

The methods which terminology relies on - identification, analysis, creation of new terms - turn it into a practical application and it works by making the difference between term and concept. Terminology works on two levels (Herteg, 2006):

- 1) functional – which means facilitating communication and
- 2) conceptual – newly created terms must follow certain requirements: they must be pronounced easily, they must be concise, they must enable the formation of new terms with the help of affixes, they must be correct from a linguistical point of view, in accordance with the syntactical rules of the language.

In the Romanian language, many terms utilized in photogrammetry and remote sensing derive from French (this one being closer to our language) and also from English. In many cases however the translated form of the term is utilized, as shown in Table 1.

English	French	Romanian
1. Different forms – the French variant utilized		
Remote sensing	Téledétection	Teledetectie
Aircraft	Avion	Avion
Pattern recognition	Reconnaissance de formes	Recunoaşterea formelor
Histogram-equalized stretch	Egalisation d’histogramme	Egalizarea histograamei
Principal point	Point principal	Punct principal
2. Different forms – the English variant utilized		
Scanner	Balayeur d’image	Scanner
Data	Données	Date
Colour composite	Composition colorée	Color compus
3. Different forms – both forms utilized		
Sensor	Captor	Senzor, Captor
Digital	Numeric	Digital, Numeric
4. Common forms – common variant utilized		
Platform	Plate – forme	Platformă
Satellite	Satellite	Satelit
Segmentation	Segmentation	Segmentare
Photogrammetry	Photogrammétrie	Fotogrammetrie
Band	Bande	Bandă
Rotation	Rotation	Rotaţie
5. Different forms – the Romanian variant utilized		
Target	Cible	Țintă
Ground Control Point	Point d’appui	Punct de sprijin
Processing of image	Traitement d’image	Prelucrarea imaginii
Contrast enhancement	Rehaussement de contrast	Întărirea contrastului
Software	Logiciel	Program
Computer	Ordinateur	Calculator
Monitoring	Suivi	Urmărire
Environment	Milieu	Mediu
Data bank	Banque de données	Bancă de date

Table 1. The source of specialized terms utilized in the Romanian language

In some cases, where it is difficult to translate the term, we consider that in first step should be to take the term in the original form, between quotation marks, in this way avoiding the inadequate translation (for example, the English “rendering” is improperly translated into Romanian “randare”).

On the other hand, some terms have a well established equivalent in our national language, for example, “indici de referință” (in Romanian) for which the term “mărci fiduciale” from the English “fiducial marks” has recently been used. In this case, we recommended the use of the classic term in the respective language, with the mention of the equivalent term in the English language (Turdeanu, 2005).

Likewise, we consider that although in solving some problems, certain personalities had an important contribution, it is desirable to avoid the personalization of some methods, using the mathematical designation (for example, similarity 3D transformation, instead of Helmert transformation), or what the respective method consists in (for example, relative orientation of dependent images, instead of Shut method).

3. SOME ASPECTS REGARDING THE NOTATIONS

Like in the case of terminology, the notations must be simple, suggestive and they should correspond both to the national language and to the international usage.

Thus, the Romanian “punct principal” with the correspondent “principal point” (in English) and “point principal” (in French) should be marked with the letter \mathbf{p} and not with \mathbf{H} (resulting from the German term Hauptpunkt). Likewise, for the Romanian “matrice de rotație” with the correspondent “rotation matrix” (in English) and “matrice de rotation” (in French), the most suitable mark is \mathbf{R} , although sometimes it is marked (even in some Romanian books) with the letter \mathbf{D} (resulting from the German term Drehung), or with \mathbf{T} (transformation matrix).

On the other hand, we consider that the elements of a matrix, that is marked with block letters, must be represented with corresponding small letters (for example, \mathbf{r}_{ij} - the elements of the matrix \mathbf{R}). Regarding the matrix of normal equations system \mathbf{N} (with the elements \mathbf{n}_{ij}) it may be partitioned (to aero triangulation) in \mathbf{N} , \mathbf{N} , \mathbf{N} , or described in reduced form $\hat{\mathbf{N}}$, keeping the signification referring to **normal** equations system.

Another recommendation is to avoid (as much as possible) the notations with indices. For example, the longitudinal parallax \mathbf{p}_x and the transversal parallax \mathbf{p}_y (or \mathbf{p}_z in terrestrial photogrammetry) must be marked by \mathbf{p} and respectively \mathbf{q} , for a more simple description of transversal parallax \mathbf{q}_1 , \mathbf{q}_2 , etc. in standard points.

On the other hand, it is desirable to distinguish between the points and elements from the object space and the corresponding points and elements from the image space. Thus, those of the former should be noted by block letters and those of the latter with corresponding small letters. For example, \mathbf{p} - the principal point on photogram and \mathbf{P} - its correspondent in terrain, or \mathbf{B} - base in object space and \mathbf{b} - base at stereo model scale.

Likewise, it is good to maintain the classical notation (in photogrammetry) for the three rotation angles: ω (around the x axis), φ (around the y axis) and κ (around the z axis), although

other definitions and notations for the angles that compose spatial rotation matrix are also used.

4. CONCLUSIONS

First, we must remark that the unification (standardization) of the notations is practically impossible to be totally achieved, but it is desirable that this should be made at least for the basic notations. However, their clear definition is necessary and, especially in books of our branch of science, it is advisable that a list the symbols used, alphabetically ordered, for an easier identification should be presented.

Referring to the terminology, there should not exist differences in the definition of the used terms, but it is advisable that the different variants of the same term should be defined (if they exist), as well as the corresponding term in the English language (possibly in French and in German too).

Unfortunately, in the recent edition (the fifth) of the Manual of Photogrammetry edited by the American Society for Photogrammetry and Remote Sensing (in 2004), the chapter “Definitions of Terms and Symbols Used in Photogrammetry” which in the fourth edition (1980) was the object of the last chapter (XIXth), does no longer appear. Updated (of course) with new terms, it would have been very useful.

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