REVIEW ON PUBLIC RELATIONS OF PHOTOMATICS

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ABSTRACT:

This paper reviews on
* Public relations,
* International cooperation and
* Technology Transfer
in Photogrammetry and Remote Sensing.
Recent developments in this field show great improvements in adapting digital models, processing and evaluation methods. To stimulate further international exchange and progress herein, the national achievements, as far as possible, will be described in a standardized manner.
Public relations are important as well, to point out the selfunderstanding of our profession. Of course these activities are accompanied by particular problems in education, research and international cooperation. In addition, representative samples clearly will indicate the tendency "from foreign aid to real international cooperation". The term "Photomatics" is used as a new short term, to replace the word-construction "Photogrammetry and Remote Sensing", to carry out the importance of leaving old terms and structures but also to deal with the tradition of our profession in order to promote the future of our subject and society ".

1. PUBLIC RELATIONS OF PHOTOMATICS

Nowadays, where even kids already work with image processing software, **the evidence of the need of our profession is not understood enough by the public.**
To stop this tendency, for the surviving of our society, one of the most important tasks of the next years is, to carry out suited public relation aids. In these respect public relations shall deal with **highlights of Photogrammetry** and Remote Sensing. From this, also the general understanding of our **profession will improve** and the appearing gaps of the market in particular stimulate for further progress:
"That" highlight of Photogrammetry with no doubt is the invention of **photography** itself by **NIEPCE** (FRANCE) in **1839**.
Consequently after this historical event some "classical" inventions of **analog instruments for visualization, interpretation and geometric evaluation** appeared on the market. These instruments are namely the **stereoscope**, the Stereo-Comparator (about **1900** by **PULFRICH**), the **Stereoplotter**, the Multiplex, the Rectifier, the analog Orthophotoprinter, etc..
Stimulated by the invention of the computer, this queue in **1956** was highlighted by the invention of the **hybrid Analytical Plotter** according to **HELAVA.**
From a progressive point of view these are all **historical instruments**, though they are partly still in use and even still in production.
Nowadays the digital computer data transmission- and display-technology in conjunction with **satellite imagery** initialized the **digital raster data** processing.
There is no doubt, the **computer became that highlight invention** of mankind.
Currently state of the art digital **image processing** systems **and GIS** systems based **on PC or Workstation** are **replacing** the analog photogrammetric instruments, maybe even completely. From that point of view the appropriate hard- and software stays in the tradition of Photogrammetric Instruments and evaluation methods.
Today real **gaps** of the market for our profession only can be seen in connection with digital methods, see **SCHUHR (1994).**
Nevertheless the use of the **Multiplex**, or a comparable instrument, should be continued at least for **educational** purposes, even in the digital age. In addition, due to software improvement purposes, the Multiplex concept is very good suited **to visualize** the problems of **mathematical models** to be used in Photomatics.
Photogrammetry and Remote Sensing of **today** consequently require **digital solutions** in order to tackle with the enormous **working load**, like the providing of **global up to date** medium scale **maps**, etc. and to **maintain** products of high quality.
In addition for public relation purposes and for the selfunderstanding of our profession it is also very important to **replace** the long word-creation **"Photogrammetry and Remote Sensing" by**, e.g., the term **"PHOTOMATICS",** to be used as a short and expressive term, to carry out the importance of leaving old terms and structures but also to deal with the tradition of our profession in order to promote a future of our subject and society.

A changing of the **name of our society** like into **"Inter-PHOTOMATICS" (=IP),** to replace the old-fashioned "Photogrammetry and Remote Sensing", is overdue.
Photomatics should be understood as a **part of "Mediamatics",** which is more and more influencing all parts of our daily life.
The term "Photomatics" would include topographic and nontopographic activities.
Therefore the requirement of the **"geo-dogma**", which is still promoted in our society **is obsolete.**
Beside "Photomatics" as **candidates** for a new name of our society **"Spatial Information Sciences" (CASE,** 1992) , **"Iconic Informatics" (WANG,** 1994) and **"Image Science"** etc. should be discussed, too.
Of course this renaming must be the **root for** a complete **reformation** of our society.
Obviously **recently** there is **no full systematic** within the queue of the 7 ISPRS commissions.
An engagement in this matter might lead to a queue of **6 topics**, suited to contribute to the discussion of renewing the names of the ISPRS commissions:
These topics are:
1.) Professional Matters
2.) Projects (suited for the use of Photomatics)
3.) Sensors
4.) Image-Generation (including image and text data bases available via, e.g., www)
5.) Image-Rectification (including digital image processing, GIS etc.) and
6.) Image-Interpretation (including artificial intelligence etc.)

2. INTERNATIONAL COOPERATION

Topics for international cooperation appear **within a matrix**, which is **stating solved and open problems** in Photogrammetry and Remote Sensing. This matrix does not claim for completeness, but shall stimulate for further progress in research and practice of our profession, in particular **with respect to international cooperation.**
The idea behind is, to **list all products** of Photogrammetry and Remote Sensing as complete as possible, see table 2.1.Beside others, these products in general are **"coordinates".** Every **product defines a line** of the matrix.
Of course the listed results of photogrammetry and remote sensing are not really listed completely.
The **columns** of this matrix refer to the photogrammetric **devices**. In this very first stage not really all existing Photogrammetric devices are listed complete as well, which again leaves space for own additions to the reader. There is no doubt, Digital Image Processing Systems and GIS-Systems are taking over the role of conventional Photogrammetric instruments. The term **"Digital Image Processing System"** here stands for a Workstation or PC based image processing and analyzing system, including the hard- and software for periphery instruments, like scanners, digitizers, plotters etc.. Though, today mainly no special purpose computer is in use, the term "Digital Image Processing System" is according to practical requirements.
The situation for GIS -Systems is similar. Today digital image processing systems are more dealing with rasterdata while GIS-Systems are mainly dealing with vectordata. This distinguishing recently more and more becomes obsolete.
In continuing the description of the matrix, the "attributed cross" (❖) within the matrix fields indicate typical achievements and stands for solved or almost solved problems, belonging to the production of that particular photogrammetric device. **For example**, from table 2.1 it is easy to read, numeric image coordinates of separate points are the main result of **comparators.** For this topic recently **no** real **need** for international activities can be defined, though the problems of image coordinate determination will increase, but supposed to be **solved by Digital Image Processing Systems .**
This situation is completely **different** for, e.g., **Digital** Image processing Systems, where the optimistic **"smilies"** (☺) **assign real needs for international cooperation** in research and practical application, including progress **in mathematical modeling, software improvement and practical acceptance**.
Blank fields within the matrix **indicate** recently impossible or **unnecessary achievements** of that particular instrument. For the comparator column, this shows again, the comparator is (mainly) limited to coordinate measurements, which is according to practical applications of that particular instrument.
Consequently from the complete table 2.1, real needs for international cooperation currently only appear within the digital part. Thus there is no real future market for analog or analytical instruments.
In this context the needs for international cooperation do not mean, that the activities in this area have to start from zero, but from the author's point of view, here still a big job is waiting for clever scientists and practical users.
The main current fields for international cooperation in research and practical application of Photogrammetry and Remote Sensing directly can be read from table 2.1 (as indicated by the sign "☺"). Here the needs for international cooperation mainly appear for Digital Image Processing Systems and partly for GIS-Systems, both of course based on Workstations and/or PCs. According to this, the fields for international cooperation **are in particular:**

1.) The area of 3D visualization for digital image processing systems, which is still unsatisfactory. So far all systems depend on aided eyes. Unfortunately the progress in Laser based real 3D Video TV still is very slow. Currently the Stade-system uses a cylindrical screen, which for the very first time allows **stereo viewing from any side with unaided eyes!**

2.)So far even in analog **interpretation of video** processed imagery only little work has been done.

3.)Another big field for cooperation is, to manage the problem of **digital interpretation** in an efficient way. This is of course mainly a question of improvements in algorithms and software, but which might include tendencies of **artificial intelligence.**

4.)In particular within digital image processing systems still much work is left for **automatic controlpoint definition, recognizing, measurement, coordination and further geometric processing etc.**

Instruments and (geometric) Results of Photogrammetry									
Results of photogrammetric evaluations		Photogrammetric instruments: Stereo-scope	Compa-rator	Stereo-Plotter	Analy-tical Plotter	Recti-fier	Ortho-photo device	Digital Image Processing System(WS,PC)	GIS
Visualization	Mono	❄			❄	❄	❄	❄	❄
	3D	❄			❄			☺	☺
Interpretation	analog	❄		❄	❄			☺	☺
	digital			❄				☺	☺
numeric coordinates	controlpoints		❄	❄	❄			☺	❄
	topographic objects			❄	❄			☺	❄
	D.E.M.			❄	❄			☺	❄
Linemaps (vectordata)	analog			❄	❄			☺	❄
	digital			❄	❄			☺	❄
Photomaps (rasterdata)	analog			❄	❄	❄	❄	❄	☺
	digital							❄	☺

Table 2.1 Market Gap Matrix for **international cooperation in Photogrammetry and Remote Sensing**

5.) So far great activities appear within the field of **Digital Terrain Model** determination. Beside conventional digital operations, **interferometric radar imagery** as that highlight of the ISPRS Washington congress in 1992, might show a great future.

6.) Still a problem and from that a field for international cooperation is the production of analog **maps from digital raster data,** though, namely within this field, many activities successfully have been carried out.

7.) Another cooperation field in connection with the problem as mentioned before, is the **efficient manipulation of half tone image** raster data to derive sufficient digital vectordata, representing that area, but requiring **reduced storage** capacity, comparable to GISsystems.

Beside others, for **GIS** systems mainly the following fields for **international cooperation** are left:

8.) The still unsatisfactory **3D visualization for GIS** systems.

9.) Digital aiding of the analog **interpretation of GIS** products so far is also a field for international cooperation.

10.) Another real matter for international cooperation for GIS systems is to solve the problem of **multilayer digital interpretation** in an efficient way. This problem includes, e. g., the realistic simulation of the **propagation of emissions**.

Summarizing, improvements namely are expected in modeling, software improvement, instrumentation, Analysis and standards etc.. According to **HEMPENIUS** today every discipline is influenced by remote sensing techniques.

3. TECHNOLOGY TRANSFER

International cooperation and technology transfer are near related. For public relation purposes and for the selfunderstanding of our profession it is also very important, to point out the **tendency "from foreign aid to real international cooperation".** An international **representative prototype** to verify this, is the program system **"virtuozo",** a Joint Venture between China and Australia.
In future **important information on technology transfer and international cooperation** will be derived **from member reports rather than from national reports**, which so far have almost neglected by the ISPRS member countries. Adapted to the multimedia age, **using internet, www**, etc., the national reports will become an important **source for potential counterparts and subjects for technology transfer and international cooperation.** Thus the importance of the national reports will improve, due to an increasing of the international exchange, see BÄHR (1994). Therefore it must be appealed again to the member countries, to

submit their national reports as an obligate contribution to the ISPRS congresses, but also to participate in the discussion of a state of the art specification of the content and appearance of the national reports, see JACHIMSKI (1994).
On the other hand, a complete standardizing of the national reports is not foreseen and might even not be realistic.
To point out national specialties, the content of the national reports should follow the idea "as free as far possible, but standardized as far as necessary".
Therefore this chapter only deals with parts, foreseen for standardization in the **"national report matrix"** to be defined (**see Table 3.1**).
This matrix should allow easy connection with digital aids.
It is highly recommended to carry out separate national report matrices at least for research, including education, see KONECNY(1992), practical application, INTERNATIONAL COOPERATION and/or TECHNOLOGY TRANSFER, history etc..

According to **MORAIN (1992)** an additional splitting of the practical applications into private practice and government Civil service might be useful.

The proposed content of the national report matrix does not claim for completeness, but shall stimulate for further progress in discussions and research in this field.
Suggestions, additions and modifications are welcome.
Every member of a national society can contribute his own matrix content to the national report matrix, which will contain the summarizing information.
Of course it is the responsibility of the ISPRS to evaluate the content of this national and/or member reports, including global visualization, for comparison and stimulation for future progress. It is highly recommended, to provide this information via internet and world wide web.
The idea behind this matrix is, to **list all products of Photogrammetry and Remote Sensing** as complete as possible.
Every **product** defines a **line of the matrix:**
Line 1: Visualization (mono and stereo)
Line 2: Interpretation (analogous and digital)
Line 3: Numeric coordinates (controlpoints, topographic objects and DEM data)
Line 4: Linemaps (analogous and digital (vectordata, GIS))
Line 5: Photomaps(analogous and digital (rasterdata, imageprocessing) etc.

National activity: Application of Photomatics:		method	stage	progress	meetings	publications	special etc....
Visualisation:	mono						
	3 D						
Interpretation:	analog						
	digital						
Numeric coordinates:	controlpoints						
	topo objects						
	DEM data						
Linemaps:	analog						
(Vectordata)	digital						
Photomaps:	analog						
(Rasterdata)	digital						
etc....							

etc.

National activity:		Model used	Software applied	Hardware used	Practical accept.
Application of Photomatics:					
Photomaps analog (Rasterdata) digital	aerial photogr.				
	scannerdata				
	radardata				
	near range etc.				

Appendix to the Member Report:
Country.....date.....period.....
submitted by: organization.....approved.....
topic: (indicate):-research(including education)
- practical application(private practice/governmental service)
- international cooperation
- history etc.

Table 3. 1: The Member Report Matrices (Draft) (window zooming for the field Photomaps and method)

Of course not really all possible photogrammetric results are listed, which again might stimulate the reader to own additions and possibly leads to surprising cognitions.

The columns of the matrix indicate the national activities in Photogrammetry and Remote Sensing:

Column 1: Method
Column 2: Stage
Column 3: Progress
Column 4: Meetings
Column 5: Publications
Column 6: Special
(Column 7: Education)
(Column 8: Cooperation) etc.

Again, in this draft version not really the complete list of activities is stated, which might leave own contributions to the reader, too.

Obviously the national report input has to be worked out much **more sophisticated than** it is stated **within this draft matrix.** The term "method" for example, at least stands for "mathematical model used", "software applied", "hardware used", "practical acceptance" etc., see table 3.1.

The matrix fields have been left blank for the national input.

Fields, kept blank within this matrix after reporting, directly indicate gaps within national activities for the reporting period, which should be indicated with "no activities".

Fore the use of this matrix **typical questions** might appear, for instance

- which matrix field is foreseen for reporting on a 30% aerial photography coverage of a country?
(It is under the line of visualization or under an extra line)
- Where has to be indicated the use of GPS for aerial photography?
(under "numeric coordinates" and assigning the particular method)
- Where to put the establishing of some GIS systems for educational purposes?
(under "digital vectordata" in the "education matrix" and/or under an extra column)
- Where is the space, foreseen to state achievements in international cooperation?
(it is the complete "cooperation matrix")

For a more impressive worldwide overview of the activities of our society, **global maps, based on the national report matrices** will be provided conventional and via internet and/or www, too. It is suggested to **establish an ISPRS-GIS system for international synopses of stages and improvements,** for photographic coverage, topographic Mapping and updating etc., to be updated permanently or **at least within the 4 year's period,** see **WALDHÄUSL**(1993).

4. LITERATURE

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